August
1949

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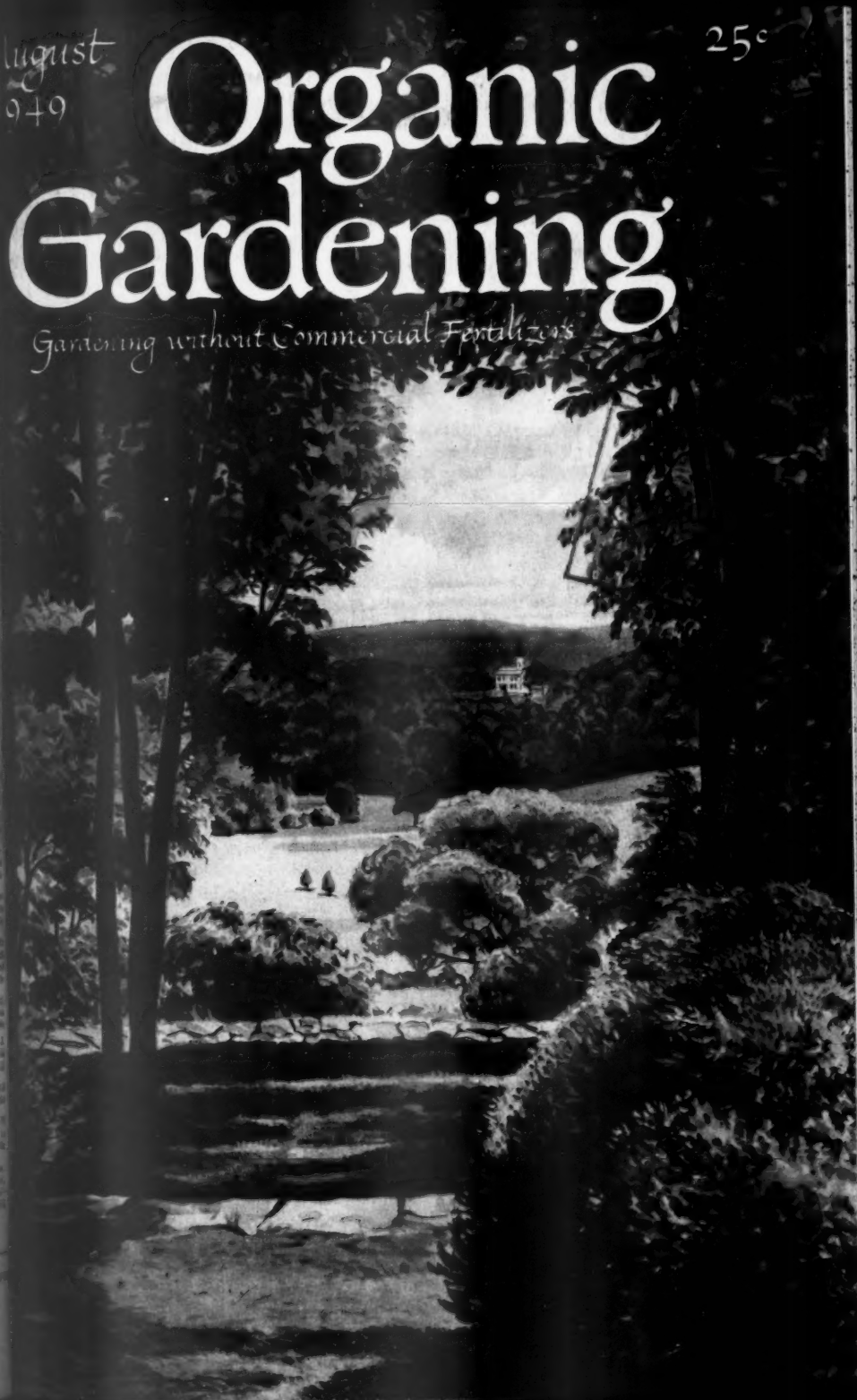
Organic Gardening

Gardening without Commercial Fertilizers



ORGANIC WAYS CHANGE 750 "WORTHLESS" ACRES INTO RICH FARMLAND

Successful Grower Tells Whole Story in New Rodale Book, "HUMUS AND THE FARMER"

HERE is the true and fascinating story of a large farm successfully operated according to organic methods. With graphic descriptions, fully illustrated, recommendations are given for the making of pastures, reclamation of waste or derelict lands, and increasing the water-holding capacity and productivity of the soil. The value of mixed farming and reforestation, the importance of the earthworm, and the mechanization of the compost method are all clearly explained in *Humus and The Farmer*, just published by Rodale Press.

It all began when what was regarded as one of the best herds in England proved, upon government inspection, to be 66% diseased—the result of deficiencies in the food plants. The herd was dispersed and the valuable farm land sold. Friend Sykes then purchased 750 acres of land on the Salisbury Plain which farmers round about considered practically worthless. He subsoiled it and fertilized with natural manures exclusively. Pasture and crop plants were grown which were rich in minerals and other nutrient materials. As a result, the cattle and horses were maintained in such health and vigor as had been hitherto unknown, and the land is now eagerly visited by outstanding agriculturists as one of the most interesting farms in the country.

Prize Galloway Matron, Elsie II (from "Humus and The Farmer")

Artificials Uneconomical

In his valuable, exciting book, *Humus and The Farmer*, Mr. Sykes places his essential acts of good farming in the following order of importance: (1) the four-year pasture, (2) good cultivation, including subsoiling, (3) organic manuring through the grazing of stock, and (4) composting. The details he gives of some of his scientific records on the farm are startling in their originality and intriguing in their indication of the inadequacy of orthodox methods.

In discussing the organic method with present-day agronomists, the latter invariably end the discussion by saying that the ideal method of fertilization of the soil includes the use of plenty of both organic and artificial fertilizers. This is a difficult argument to refute, but Mr. Sykes deals with it convincingly and gives comparative figures to show the financial disadvantage of adding any artificials whatever to adequate organic manuring. The author foresees a dark future for agriculture if present practices are long continued.

Tripoding clover for seed (from "Humus and The Farmer")

Order today from

416 pages . . 40 photos . . $4.50

ORGANIC GARDENING, Dept. O.G.8-H, Emmaus, Penna.

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1. STONE MULCHING IN THE GARDEN

A NEW invention in gardening! An authoritative guide to the use of stones and rocks for obtaining greater yields and healthier plants. This sensational but natural practice obviates such chores as digging, cultivating, hoeing, and weeding. Here is the most remarkable and promising cultural practice proposed in recent years. Cloth, 164 pp., 50 photos. **$3.00**

2. PAY DIRT

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3. The Healthy Hunzas

A BOOK about the inhabitants of the northwestern section of India who are astoundingly healthy because of the way they raise their food. A race of over 22,000 people, the Hunzas possess a bodily buoyancy that makes them utterly unique in the roster of the world's national groups. This book should revive our conception of nutrition. Full details show how any gardener or farmer can apply the Hunza methods. Cloth, 263 pp., 20 full-page illustrations. **$3.00**

ORGANIC GARDENING, Dept. O.G. 8-R, Emmaus, Pa.

THE ORGANIC FARMER

A New Magazine Issued by the Organic Gardening Organization

AT the request of thousands of farmers from all parts of the United States and Canada, the ORGANIC GARDENING ORGANIZATION is now launching a new *farm magazine,* called THE ORGANIC FARMER. This magazine will be devoted exclusively to all aspects of farming such as crop rotations, the reclamation of abandoned farms, soil management, soil building and fertilizer practices, and other fundamental agricultural practices based on *the organic method.* THE ORGANIC FARMER will in no way duplicate materials published in *Organic Gardening* magazine. It will be concerned with the organic method as related to farms however small or large.

Sufficient tests of the organic method on a farm scale have been made to prove that this method is not only practical but highly profitable. Cover crops as green matter and sheet composting enable the farmer to make compost on a farm scale without special equipment or additional labor.

Each 64-page issue of THE ORGANIC FARMER will be filled with articles on the organic method on the farm, as well as the latest information on all aspects of farming. It will be issued monthly, beginning this summer.

Don't miss the first issue of this important new publication. Subscribe now for one year ($3.00), two years ($5.00), or three years ($6.00). Send check or money order, or ask us to bill you. *Write today!*

THE ORGANIC FARMER
Dept. OG-8F
Emmaus, Pa.

Contents

VOLUME 15, NUMBER 2 AUGUST 1949

THE ONLY MAGAZINE DEVOTED EXCLUSIVELY TO ORGANIC GARDENING

Organic Gardening

- Editor and Publisher
  J. I. RODALE

Managing Editor
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The Forum	3
Editorial—Cancer Part IV — J. I. Rodale	12
Table Arrangement — Hilda Treby	18
Winter Storage Of Vegetables — Dr. W. H. Eyster	19
How a City Solved Its Garbage Problem — F. D. Steiner	22
Miscellany — J. I. Rodale	26
Lawns and Lawn Grasses	30
Stabilizing Growth With Mulch — Winton H. Reinsmith	32
Color Combination With Phlox — E. I. Wilde	34
Botany For The Gardener (21) — Dr W. H. Eyster	37
Rock-Bottom Apples — Norris A. Jackson	40
A Bill Submitted to Congress—Commercial Fertilizer	42
Basket of Gold — C. L. Wittrock	44
Garden Calendar—August	46
Two-by-Four Farm — Alden Stahr	49
Homemade Plant Cutter	51
Organic Garden Clubs	52
The Soil And Health Foundation	53
New Books	55
Readers' Correspondence — Dr. W. E. Eyster	57

OUR COVER this month shows a view from the A. H. S. Cantlin estate near Allentown, Pa., with the old Salisbury Church in the distance. The scene is close by the Organic Gardening Experimental Farm.

ORGANI-CULTURE

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SAVE TIME-SAVE LABOR-SAVE MONEY

with a WIL-GRO GARDEN AID Compost Box

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Healthy, Sturdy Plants

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Please mention ORGANIC GARDENING when answering ads.

COMPOST MILORGANITE

Dear Sir:

I am becoming skeptical about milorganite. I have a small vegetable garden in which I have employed organic methods for the past fifteen years or so. For some time I have been using milorganite with, it seems to me, increasingly disappointing results. I have noticed for the past few seasons that seeds are slow to germinate and many fail to germinate at all when I use milorganite—also that the plants grow slowly after they do come up. I have not noticed this difficulty with other organic fertilizers such as "Ko-K-O", etc.

This spring I have been putting milorganite to actual controlled tests. I planted two rows of okra side by side at the same time and under identical conditions except that I used milorganite in one row and Ko-K-O in the other. In the row fertilized with Ko-K-O practically every seed was up in three days and each plant has been thriving ever since. In the row fertilized with milorganite only about half the seeds germinated and the plants which did come up are growing much more slowly than the row fertilized with Ko-K-O. I then planted three rows of Brabham cow peas side by side under exactly the same conditions except that I fertilized the middle row with Ko-K-O and the rows on either side with milorganite. Those fertilized with milorganite showed poor germination and growth and the row fertilized with Ko-K-O showed excellent germination and growth as in the case of the okra. Next I planted three more rows of Brabham cow peas under the same conditions except that I used no fertilizer in the middle row and Ko-K-O in the rows on either side. All three rows germinated well and showed equally good initial growth but in the rows fertilized with

Yes! YOU CAN HAVE HEALTHY VIGOROUS PLANTS THE EASY WAY with Ko-K-O
50 Lbs. Net Wt
HERSHEY'S Ko-K-O
ORGANIC SOIL CONDITIONER & BUILDER
FOR LAWNS and GARDENS
Made by HERSHEY Estates
HERSHEY, PA.
STORE IN COOL DRY PLACE
HERSHEY'S Ko-K-O
HERSHEY'S Ko-K-O
WHAT IS Ko-K-O?
Cocoa bean shells and other parts of the cocoa bean are blended expertly and sweetened to produce a natural, organic material that will furnish a steady source of humus for the soil.

FOR LAWNS AND GARDENS

- **Apply Direct to the Soil**
- **Mix in the Compost Heap**
- **FEED TO EARTHWORMS**

An essential material for the Organic Gardener .... A slow-acting, long-lasting energizer that increases and replenishes the organic content of the soil .... Improves soil texture .... absorbs and retains plant-nourishing moisture .... helps decomposition of soil break-up into humus .... binds sandy soils .... loosens clay soils.

Packed in Handy 50 Lb. Bags If your dealer cannot supply you we will ship direct to you. Freight prepaid East of Mississippi River. (Write for freight rates west of Mississippi River.)

NEW LOW PRICE

Send $1.90 for each 50 lb. bag; enough for 200 sq. ft. of NEW lawn or garden. Minimum Shipment 100 lbs. (2 bags).

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BETTER COMPOST
BETTER SOIL
Prettier Flowers, Superior Vegetables and Fruits

Learn the joy of Organic Gardening!

ActivO gives you the power to make soil and plants respond as Nature intended

ActivO is a remarkably RICH, black, velvety HUMUS fortified with billions of Nature's own helpful micro-organisms—plus minerals, biotics, antibiotics, hormones, vitamins and other growth substances which plants MUST have for healthiest growth, blooming and fruiting . . . and which most soils can't supply in amounts needed or may lack altogether! . . . With this unusual product you can do a lot of unusual things:

ACTIVO

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ACTIVO

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Ingenious Composter Cabinet yields continuous supply humus. Use in basement, garage or backyard. Buy or build from plans. Guide and plans FREE with No. 25 size ActivO ($6.79 in stores; $6.99 prepaid 300 miles.) Check coupon below.

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Inclosed is ..... for $..... Send best way:

☐ No. 25 size ActivO, for up to 3 tons compost, and FREE Composter Plans, $6.99, p'pd.

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Name & Address .....

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P. O. and State .....

Please write name and address of your garden supply dealer on margin.

ACTIVO

Ko-K-O, the subsequent growth and appearance are superior. It therefore looks as though there is virtue in Ko-K-O but that there is something in milorganite that actually inhibits germination and retards growth.

Herbert R. Mills, M. D.,
911 Citizens Building,
Tampa 2, Florida.

(Editor's Note: *Organic Gardening* recommends that milorganite be composted before being used in the soil.)

—o—

BULBS AND EARTHWORM CASTINGS

Gentlemen:

Last year I started experimenting with various types of indoor bulbs, using earthworm castings for fertilizer. I was amazed at the results. Never before had we been able to raise such enormous blooms within such a short time.

This year I planted amaryllis bulbs using 1/3 earth, 1/3 peat moss and 1/3 earthworm castings. The results were "out of this world". The stalks and leaves were two feet high. Each bulb produced two stalks from which four trumpets spread. Each trumpet measured 8 1/2 inches across. Can you picture such a sight—eight trumpets of such a size from one small bulb? We held open house here for over a week because everyone wanted to see our results.

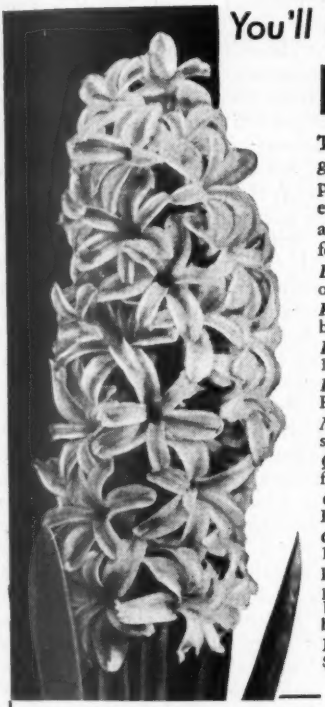
Grace L. Bahls,
2627 Idlewood Road,
Cleveland Hts. 18, Ohio

—o—

ARE LAW MAKERS SLIPPING?

Gentlemen:

The Labour Party in Great Britain has always seemed to me extraordinarily weak in knowing so little about agriculture and apparently caring less. Their movement is rooted entirely in the big industries, and though they pay lip service to agriculture, they have no real grasp of agricultural problems. They have forced up agri-



You'll Love Your Imported Dutch

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Their fragrant early Spring blooms clothe your garden in brilliant bold colors. Ideal for formal plantings; excellent with low growing Spring flowers. Flowerfield Hyacinth bulbs for Fall planting are at least 6 inches in circumference. Order now for September delivery.

Lady Derby: Popular pale pink. Early. Fine for forcing or bedding. 10 in.....Three 60¢, Six $1.10, Doz. $1.85

King of the Blues: Violet-blue, large flowers, 2 in. wide bells. 10 in. tall.....Three 60¢, Six $1.10, Doz. $1.85

L'Innocence: Pure white compact flowers, large bells. 10 in. tall.....Three 60¢, Six $1.10, Doz. $1.85

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City of Haarlem: Most popular golden yellow Hyacinth. 10 in. tall.....Three 60¢, Six $1.10, Doz. $1.85

HYACINTH COLLECTION each color separately packed. *Lady Derby, King of the Blues, L'Innocence, La Victoire.* **S-12 bulbs, 3 of each variety $1.85; L-48 bulbs, 12 of each variety $6.50.**

MIXED HYACINTHS glorious mixture of colors, **25 for $3.50, 100 for $12.00.**

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cultural wages (this also was a reform overdue and necessary) but have given little thought as to how those wages are to be met.

Thus we can expect no support from them for the organic husbandry movement. I would rather expect any such support to come from the conservative side, where there still lingers a profound knowledge of and passionate interest in the land. This interest is our inheritance from old days; it has been of untold value. With the increasing impoverishment of the landed classes, it is tragically vanishing, but is being silently replaced, almost without our being aware of it, by the new interest in the land of the middle classes. These are less wealthy and

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Turnips, 6 to 12½ lbs. Grown in pure humus from our worm beds. No commercial fertilizer used.

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less influential, but there will be many more of them. They are very receptive to the ideas of organic husbandry, and our movement gains its principal support from them, though we also have adherents both among the land owning and among the working classes.

But when all is said and done, the reception of our ideas does not depend on the political people at the top. On such things they would be wholly guided by their scientific advisers. Unfortunately, agricultural scientists in England have been from the outset very hostile to the new ideas, which I think must in part be attributed to professional jealousy directed against my husband, who coming home from the East, had, in their eyes, the presumption to criticize the conduct of agricultural research here as he viewed it after a long absence with fresh eyes. The hostility has persisted for other and deeper reasons, for the new theories call in question so much that has been done and is being done that it is natural that those concerned should view them with alarm as threatening the whole outlook of formal agricultural research. Such views are conveyed to the highest circles and form an impassable barrier to the entry of our ideas. One day, of course, the barrier will break, and then the flood will come, but in my view it will be purely accidental as to whether this happens under a Labour or under a Conservative Government.

Lady Louise E. Howard,
14 Liskeard Gardens,
Blackheath, London, S. E. 3

—o—

NEWSPAPER ACKNOWLEDGES ORGANICULTURE

Gentlemen:

Enclosed is a clipping cut from a local newspaper last year. I considered it rather interesting from an "organic gardening" viewpoint and plan to give it a trial this season. Your comments upon the method described in the clipping would be appreciated.

We have been gardening the organic way for three years and of course,

would not think of ever again going back to the highpowered "shot-in-the-arm" method of growing fruits and vegetables.

A patch of raspberries that had been planted on virgin soil and producing large quantities of delicious fruit, was gradually ruined by annual applications of commercial fertilizers and a disregard for the return of humus to the soil. The yield diminished, the fruit was small and tasteless and the fruit worms were in control in spite of our faithful adherence to a recommended spray schedule. Last year, after two years of heavy applications of leaves, hay, straw, etc., and some compost and rock phosphate, as well as the elimination of all spraying, we were rewarded with a crop of berries such as we originally raised on our virgin land.

This is but one of the many examples of how we have been rewarded by following nature's or the organic way of gardening.

Your magazine is a most interesting and valuable reference book of information for the farmer, the gardener and in the final analysis, for all who are interested in improving the foods we eat, for in a manner of speaking, "we all eat the soil we live on".

Miss Pearl Thiessen,
624 North St.,
Kiel, Wisconsin.

—o—

COMPOSTING SATISFACTORY

Gentlemen:

I made organic gardening my scientific hobby and a preferred subject of conversation with friends and business men. The field of application is a small scale vegetable garden, strictly organic, and therefore, successful. Quality and yield are recognized as outstanding, and the plants are becoming more and more resistant to the attacks of insects and fungi. The pride of my garden is, of course, the Compost Bin. It is inside 4x4x5 feet high, big enough to supply all the compost I need. It is of wood construction consisting of four square

Brownell Roses

Red Duchess
AND OTHER EVERBLOOMING
Sub Zero Hybrid Teas
25 Different Colors and Forms
Vigorous. — Beautiful. — Easy to grow. — Large abundant blooms, more constantly. — Comparable with the best. **Can live several decades even after low sub-zero.** *Save replacement expense.* **Plants that fail, anywhere, within 2 years, replaced free, purchased from the hybridizers—**
Also beautiful yellow and orange hardy Climbers
Send for pictured list
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52 Rose Park, Little Compton, R. I.

GLORIOUS CLIMBING BEAUTY—
CLEMATIS

A sturdy climber—blooms profusely. Delicately flowered—ideal for trellis, fence, or wall. Plant several this fall! Write for color folder showing 12 varieties clematis, 6 other ornamental vines.
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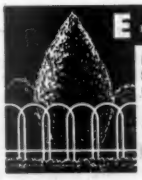
E-Z-GARDS



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Self-Supporting—No Stakes or Posts!
Easy to set up and just as easy to remove.
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SHELBYVILLE, INDIANA

Q.R.
COMPOST-MAKER

FREE FROM CHEMICALS

This Q. R. Compost-Maker, originated by Miss Maye Bruce, is the remarkably successful outcome of almost a lifetime's research and experiment.

Purely herbal, clean and simple to use, Q. R. stimulates the micro-organisms which in a few weeks break down all waste vegetable matter into rich, sweet-smelling, humus-laden compost.

"I write with pride and satisfaction of the results obtained in my garden with the Q. R. Compost-Maker sent me about a year ago. Especially marvelous have been the results with my Gladiolus, Delphiniums, French Roses and Strawberries".

H. L. B. (Minneapolis)

TWO-FOLD OFFER FOR $1

For $1 we will mail you, postpaid, a large packet of Q. R. (enough for six heaps of compost) together with a copy of Miss Maye Bruce's new book "COMPOST MAKING". Be advised to order early.

CHASE PROTECTED CULTIVATION LTD.
The Grange, Chertsey, Surrey, England

COLCHICUM 6 for $2

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Simply place these Bulbs on bare table-top, piano, or window sill—then enjoy the astonishment of your friends.

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Order enrolls you as Club Member, without obligation, in the famous

BULB of the MONTH CLUB
125 Madison, Dept. OGU, Chicago 3, Ill.

ORIENTAL POPPIES
STRONG PLANTS MIXED COLORS

5 Plants for only $2.25 Prepaid

NEW MARKET PERENNIAL GARDENS
25 Randolph Road New Market, N. J.

posts connected by louver-boards with ample air space, a bottom, which is 6" from the ground, supported by cement blocks and in the center is a 5" wire mesh chimney. The whole bin sets about 12" in the ground and has a pleasant appearance (for the neighbors!).

The raw material used in the bin is fresh cow or horse manure and mainly leaves from trees which are supplied in the Fall by the community. The leaves stay in an open pit during the winter, pack into soft, partly decomposed layers which are passed through the shredder just before loading the bin in early Spring. Since the bin is covered, the water is supplied by a hose, or the cover is removed during a shower. The resulting product is a loose black humus with a pleasant earthy smell.

A few years ago, before I knew of organic gardening, the soil was heavy, mostly clay, and hard to cultivate, now it has a dark color, is loose and holds the water without caking.

I had a most gratifying experience last summer; I prepared several drills with vegetable seeds by making small channels with a piece of 2x4, filled them to half their depth with a mixture of shredded compost and earth, placed the seeds and covered with the same mixture to the required depth. At night we had a cloud-burst-like rain and I thought that the seed was surely washed away; but I was agreeably surprised in the morning to find all the drills intact without any sign of erosion. The soil had absorbed the water so readily that no streams could be formed to wash the soil and seed away. This is but one of the many observations which prove the truth about organic gardening.

H. L. Ammann,
P. O. Box 388,
Madison, New Jersey.

—o—

MOLES AND MOTH BALLS

Gentlemen:

When I moved here ten years ago my garden was full of moles. It was

ABOLISH YARD RAKING
PULVERIZE AUTUMN LEAVES
with
MOW-MASTER
Grind-a-Leaf
Extra Service, Rotary Power Mower
IMPROVES LAWNS—ENRICHES SOIL—KEEPS YARD NEAT AND CLEAN—NO NEED TO RAKE, HAUL OR BURN LEAVES NOW—EASY TO RUN—2 H.P. ENGINE—STURDY, ALL METAL MACHINE—BUILT FOR YEARS OF SERVICE.
CUTS GRASS and WEEDS, TOO—
Simply remove Grind-a-Leaf Attachment—Done in a jiffy.
See Your Dealer or Write for FREE Literature
PROPULSION ENGINE CORP. Dept. GA-14
7th St. and White Eagle Rd.
Kansas City 15, Kans., U.S.A.

very discouraging for me to see how they would travel the length of rows and practically ruined them.

A friend suggested that I try moth balls in the runs which I did. I would walk across the garden several times a day and place a moth ball in the run at various intervals. In a short while they disappeared and I have never seen one around here since and my neighbors do not have them either. I also told two or three friends who tried them and have had the same results.

Harry L. Besley,
Indian Head, Maryland.

(*Editor's Note*: This method of controlling moles should not be used in the vegetable garden or where food plants are grown.)

—o—

THE GARBAGE PROBLEM

Gentlemen:

In the March issue of *Organic Gar-*

Orlyt
GREENHOUSE
$425
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dening I read your article on the composting of raw garbage. I would like to tell you of my experience with garbage, using worms, leaves and soil. I found a butter tub and drilled fine holes in the bottom for air. I started a layer of soil first. Then added a thin layer of garbage. In between each layer, I put a few crumbled leaves and

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ORGANIC GARDENS
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worms. I built it up to over three-quarters full. This gave the worms plenty of room to penetrate through it. I used Activo on the garbage only once to eliminate odors. Every day I turned it over, dumping it into another tub. In less than a week the worms had turned it into rich brown pellets. I use it for growing seedlings to maturity and for repotting plants. The worms came from under a pile of leaves I stored in a sheltered place last Fall. Each week I start a fresh tub, using the same worms.

James L. Towne,
15 Hayward Ave.,
Colchester, Connecticut

—o—

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CANCER — PART IV

PROTEIN

IN the N. Y. Herald Tribune there recently appeared a series of fifteen articles by Lester Grant called, *The Challenge of Cancer,* representing a scholarly survey of the best existing medical thought on every known aspect of cancer. In it he states: "Cancer appears to be a disease in which there is a definite derangement in protein synthesis." This has been conclusively shown in work done at the Massachusetts General Hospital in Boston. It is the protein in the nucleus of cells that is involved. One of the latest theories in the attempt to find a cure for cancer is to get radioactivity right into the cell nucleus. The purpose of this chapter will be to show how much more effective it would be to feed the body protein of the highest quality and in necessary amounts so that the cell could be healthy in the first place. A healthy cell may not go cancerous.

Protein, along with carbohydrates and fats, is utilized by the body as a source of energy, but in addition to this, protein alone builds new tissues. All the most important parts of the body, our organs —the heart, liver, etc. mainly are composed of proteins. The enzymes, the catalysts that digest our food, are proteins. They create the necessary hormones. Our blood is a solution of protein molecules. The antibodies, which are called forth to protect the body when disease comes, are large protein molecules. The red and white corpuscles of the blood are protein. Protein is the chief substance necessary for life.

It is not surprising, therefore, that when cancer occurs, a disease that involves a general breakdown of the cells' functions, it should be caused by a derangement in protein synthesis. You generally hear the statement made that the cause of cancer is not known, but in the light of what I have written thus far that statement is erroneous, because it is now definitely known that cancer is caused by a derangement in protein synthesis. However, medical science has not yet decided what is the cause of the disturbance in protein synthesis. The problem is narrowed down, therefore, to a question that involves protein. We should not stray too far from that cause in our quest for the secret of the prevention of cancer.

A well-known English research worker in the medical field, J. E. R. McDonagh, in his book *The Universe Through Medicine,* who has projected a revolutionary theory that cancer is related to protein, gave a special statement with regard to it to Sir Albert Howard who quoted it in *The Soil and Health,* as follows:

"*The Nature of Disease.* Every body in the universe is a condensation product of activity. Every body pulsates, that is to say it undergoes alternate expansion and contraction. The rhythm is actuated by climate. Protein in the sap of plants and in the blood of animals is such a body, and it is also the matrix of the structures in the former, and of the organs and tissues in the latter. If the sap in plants does not obtain from the soil the quality nourishment it requires, the protein over-expands. This over-expansion renders the action of climate an invader, that is to say climate, instead of regulating the pulsation, adds to the expansion. The

over-expansion results in a portion of the protein being broken off, and this broken-off piece is a virus. The virus, therefore, is formed within, and does not come from without, but protein damaged in one plant can carry on the damage if conveyed to other plants. The protein in the blood of animals and man suffers the same damage if it fails to obtain the quality food it needs. In animals and man a third factor enters, and that is an invasive activity of the micro-organisms resident in the intestinal tract. This activity causes still further expansion, and the tissue or organ damaged is the one which originates from that part of the protein which is made to undergo the abnormal chemico-physical change, hence there is naturally only one disease, and this is regulated by the damage suffered by the protein wherein the host's resistance lies. As a result of the micro-organisms in the intestinal tract having played an invasive role for so long, they have in addition given rise to micro-organisms which can invade from without, but from these few remarks you will see that micro-organisms do not play the causative role in disease with which they are usually credited."

Sir Albert Howard commented upon it as follows:

"According to this view of disease, the heart of the subject must reside in the proteins. If these are properly synthesized in the plant, their disease-resisting powers first protect the crop and are afterwards duly handed on to the animal and to man. If, therefore, we see to it in our farming and gardening that the effective circulation of protein from soil to plant, and then to livestock and mankind is maintained, we shall prevent most of the departures from health—that is to say, disease—except those due to accidents or to abnormal climatic conditions.

"The synthesis of proteins in Nature is intimately bound up with the nitrogen cycle. The proteins made in the green leaf represent the last phase in this nitrogen cycle between soil and plant. When these proteins are manufactured from freshly prepared humus and its derivatives, all goes well; the plant resists disease and the variety is, to all intents and purposes, eternal. But the moment we introduce a substitute phase in the nitrogen cycle by means of artificial manures like sulphate of ammonia, trouble begins which invariably ends with some outbreak of disease and by the running out of the variety.

"A simple explanation of the relation of soil fertility to health is thus provided. All my own experiences and observations fall into line with this principle. The cure, by growing the affected plants in freshly prepared compost, of virus troubles in crops like strawberries, raspberries, tobacco, and sugar-cane, is explained. Imperfectly synthesized protein is then replaced by normal protein.

"In all future studies of disease we must, therefore, always begin with the soil. This must be got into good heart first of all and then the reaction of the soil, the plant, animal, and man observed. Many diseases will then automatically disappear. Only the residue will provide the raw material for the studies of the diseases of to-morrow.

"Soil fertility is the basis of the public health system of the future and of the efficiency of our greatest possession —ourselves."

Recently the College of Physicians and Surgeons of Columbia University announced that they had isolated a virus in breast cancer cases of mice. Viruses also bring about such diseases as infantile paralysis and influenza. Since viruses are proteins we see again the need for getting to the bottom of the protein cycle of soil to plant to man.

Dr. Albrecht

Dr. William A. Albrecht, head of the Soils Department of the University of Missouri, has been drawing attention in recent years to the fact that artificial fertilizers cause the plant to produce less protein and more carbohydrate. In the Kenosha, Wisconsin Evening News of May 1, 1948 he says, "During the past 10 years the protein concentration of feed grain in the corn belt has drop-

ped from approximately 9.5 to 8.5 per cent." This is a 10½% reduction in protein content in only 10 years. What will the protein content be 10 years from now if this tendency continues? Albrecht is one of America's greatest agricultural scientists of the present day and his figures are accurate. In the above mentioned article he says further:

"Hybrid corn that disregards its need for reproducing itself, does not report to us lower soil fertility by showing its increasing sterility. The carbohydrate, or fuel for energy food produced by this crop holds our attention. But little thought is given to the declining soil fertility that makes seed production and thereby the plant's reproduction impossible.

"Animal sterility, too, is an increasing problem. Crop juggling with bulk as the objective, has brought more fat and energy producing forages and feeds into our system of land use. With them have come increasing animal deficiencies. We are not apt to see declining soil fertility as the basic cause. Instead, we are likely to build a false hope on artificial insemination and other contrivances of the breeding business.

"Seemingly only by more disasters will we eventually come to see that soil fertility is the source of vitally needed protein. Protein not only represents the power of reproduction but the power of growth itself.

"We cannot continually move westward to fertile virgin soils. We must face the problem of dwindling soil fertility now that we can no longer run away from it."

Albrecht knows whereof he speaks when he takes hybrid corn to task. When I originally quoted Albrecht in this magazine about seven months ago, it brought a letter from a famous agronomist connected with one of the larger agricultural experiment stations. He charged that "the reported reduction in protein content of corn grown in the Midwest seems to reflect the advent of hybrid corn to a better degree than your implied hypothesis of increased use of chemical fertilizers." That is partly true, but what brought about the need for planting hybrid corn?

The land would no longer give a satisfactory yield of the open pollinated, domestic varieties. The point of diminishing returns had been reached. So hybrid varieties were perfected which gave a bulk product with an over-emphasis on cellulose and other carbohydrate as against protein—bulk at any cost. What will be the next move of the agricultural scientists when hybrid grains have mined the soil of its remaining fertility, and the farmer no longer is able to depend upon them to keep his yields?

First came chemical fertilizers, then hybrids. What legerdemain is being readied in the laboratory, blue-print stage right now, as the next step in the tragic process of who-is-fooling-who, when the vaunted power of the hybrids collapses? On our farm we plant no hybrid corn varieties.

Potash

The gentleman from the agricultural experiment station has overlooked another important factor in the alarming reduction of protein in the grain crops, which he believes is due to the coming in of hybrid corns. Professor Albrecht wrote another article called, *Our Teeth and Our Soils,* which was published in the December, 1947 issue of the *Annals of Dentistry.* Of the three elements used mainly in the usual conception of chemical fertilization, namely nitrogen, phosphorus and potash, Albrecht indicts potash, which he says increases the carbohydrate content of the plant with a resultant decrease in the protein. He says that "calcium is associated with the synthesis of proteins by plants, while potassium is associated with the synthesis of carbohydrates."

Professor Albrecht, in his paper, describes how Dr. E. R. Graham at the Missouri Agricultural Experiment Station experimented with the growing of soybeans with a low, medium and high ratio of potassium to calcium in the soil. "As the potassium was progressively higher," says Dr. Albrecht, "these three soils represented increasing encouragement for the plants to produce

carbohydrates more than to synthesize proteins. This narrowing ratio of calcium to the potassium resulted in an increase of vegetable bulk by one-fourth. Such an increased tonnage would warrant agronomic applause. But this increase in vegetative mass represented a reduction in the concentration of protein by one-fourth, a reduction in the concentration of calcium by two-thirds of that in the smaller tonnage yield."

Hard and Soft Wheat

Dr. Albrecht says further, "As our soils are being exhausted of their fertility by cropping under the intense economic pressure now being put on them, a single grain crop like wheat is producing itself of less protein and of more starch as time goes by. We say, 'wheat is becoming soft where it once was hard.' In our near-colonial days we produced hard wheat in the valley of the Genesee River of New York. That wheatbasket, or breadbasket of this country at that time, made Rochester the 'Flour City.' Today Rochester is still the 'Flower City' with its many parks. But the 'hard' wheat has moved westward across the United States, while the 'soft,' starchy wheat —which we seemingly desire for our pastries—is crowding along in its wake. 'Soft' wheat has now gone so far west that even in Kansas the millers and bakers are complaining about its low protein content and their low volume of bread output per unit of flour used. The farmers of Kansas, however, are delighted with their high volumes of output in bushels per acre that are possible when the plants collect only carbohydrates instead of converting these into protein of much less bulk as plant output.

"Corn, too, is doing less in its synthesis of proteins. While we have pushed up the volume of its output as bushels per acre by hybrid vigor, we have not realized that the concentration of protein in our corn grain was dropping from a mean figure of about 9.5 percent to only 8.5 percent during the last ten years."

Health Tied to Protein

"As we mine the soils of their fertility so that the output by one crop as bulk goes down, we search the world and bring in some exotic crop because it can make tons or bushels where the preceding crop failed. If this imported crop makes vegetative tons where the others failed, it must be putting out its products with less of soil fertility in them and therefore they must be more carbonaceous and probably of deceptive nutritional values.

"As a consequence of the lowered protein concentration in grains and grasses under soil fertility depletion, we have not only had the westward march of 'hard' wheat, and the clamor for more 'grass' agriculture, but also a westward march of our protein in beef and lamb. Chicago is no longer the major beef cattle market. That honor now rests on Kansas City . . .

"Here, then, in the soil fertility is the pattern of the nutritional values of our foods and feeds pointing out their lowered concentrations of minerals and proteins. Here is the lowered power of growth and lowered capacity for reproduction. Life is not passed from one fat globule to another, nor from one starch grain to another, but only from one protein to another protein molecule. Can a dentist see good permanent teeth being laid down in the jawbone of a foetus (unborn child) when the mother's diet is deficient in minerals and protein? Can he find sound teeth in school children when carbohydrate bulk predominates in their diet because of its lesser cost and easier storage . . . ?

"From all of the data of the inductees into the Army and the Navy there is the suggestion that more of our so-called 'diseases' may well be statistically mapped for the United States and compared with the map of the soil fertility. If all other body irregularities as well as those of the teeth were so viewed, it is highly probable that many of our diseases would be interpreted as degenerative troubles originating in nutritional deficiencies going back to insufficient fertility of the soil."

Schrumpf-Pierron

Now let us go a step further to show what potassium can do when it is in

oversupply. We will talk about the researches of Professor P. Schrumpf-Pierron, whose work is written up in the *Bulletin de l' Institut D'Egypte*, Vol. XIV, 1932 and Feb. 15, 1932 and others. He talks about the rarity of cancer in Egypt where malignant cases are only about one tenth that of Europe. What is the cause? After exhaustive studies and research the Professor came to the conclusion that it was due to too much potassium and too little magnesium in the foods of Europeans. On the other hand in the soils of Egypt the conditions are reversed, that is, more magnesium in relation to the potassium.

There seems to be a definite relationship between magnesium and potash wherever it is found, whether in the soils, rocks or other places. Where there is an oversupply of potash there is always an undersupply of magnesium and vice versa. Schrumpf-Pierron studied the cancer statistics for France in relation to the rock structure underlying its soils. It worked most uncannily. Wherever he found an excess of potash there he discovered less magnesium and more human cancer cases. Wherever he observed a minimum of potash he found a maximum of magnesium and less cancer cases. This means that people who ate food raised in certain soils that obtained their nutriments from the rocks which underlie them, get certain elements into their foods because of this. Such a condition would apply more to France than to the United States because in a country like France there would be more of a tendency to consume food near the point at which it is raised. But in the United States with our more advanced industrial condition where even the poorer peoples will eat winter vegetables raised in California, Florida, and elsewhere, and a great deal of citrus foods, etc. and meats that are shipped long distances, local deficiencies and unbalancings of nutritional elements may tend to be corrected to a certain extent.

When Schrumpf-Pierron found that an excess of potassium in the rocks of a region tied in with an excess of cancer cases in that section, we should note that excess potassium means excess carbohydrates in plants grown there and therefore, reduced protein in the foods. Farmers should know that it is best, therefore, to use dolomitic limestone when they apply lime, because it is rich in magnesium and acts as a safety factor in relation to the potash in the soil.

The work of Schrumpf-Pierron *must* be investigated by the medical and agricultural experts. Possibly special foods could be raised for cancer patients, rich in magnesium and low in potassium under the observation of the medical profession. An interesting remark of Schrumpf-Pierron which should be of interest to farmers and vegetable gardeners is "magnesia is an antitoxin for potash—an excess of which, as is the case for soda, (users of nitrate of soda please note) can result in sterile soil."

In the winter of 1947 a meeting was held in Paris to honor Professor Antoine Bechamp, an opponent of Pasteur. It was presided over by the Earl of Portsmouth who is one of the most vigorous advocates of the organic farming movement in England. At that meeting the Schrumpf-Pierron magnesium-potash relationship was mentioned by a Dr. Paillard of Paris who said: "Potash was said to be a wonderful manure, all the fields in the world are saturated with it; the result is, nowadays, the ground is progressively exhausted and the nations are starving. Potash neutralizes the magnesium which is necessary for antidoting the poisons of food; the lack of magnesium generates fear. We are living in a century of fear. On the other hand, I remind you that in all cases of tuberculosis the concentration of potassium in blood is about twice the normal."

In the organic method of producing food, if dependence is entirely on composts, nature has taken care of the potash. It will usually be found to be in small amounts. If in addition to composts one uses other amendments such as phosphate rock and potash rocks (glauconite, feldspars, etc.) then

the amount of such ground potash rocks should be held down severely. It is interesting to study the difference in action between the potash in such raw potash rocks and that in potash chemical fertilizers in which muriatic acid has been added to the raw rock to make it soluble. Many plants, especially the grains, are potash drunkards. They cannot resist it. Where they might exercise temperance and restraint when it comes to phosphorus ingestion all bars are lowered to potash. In the raw, insoluble potash rock, this, then would be a safety factor. Not being soluble, the plant would take it in more slowly.

New Blood Test for Cancer

Many of you may have read recently of a discovery of a blood test for detecting cancer reported by a group of physicians of the University of Chicago. The test is based on noting in the blood a protein disturbance usually found in cancer cases which reduces the ability of the blood to clot. When I read of it and saw again that cancer was related to protein, I became thoroughly convinced that a study must be made of the quality and quantity of protein in foods, and the effect of chemical fertilizers on protein. Feeding experiments, under scientifically controlled conditions, should be entered upon as soon as possible to study the effect of food produced by the organic method on cancer patients.

In the future, when money is donated for cancer research by persons who have read this series of articles, they should condition it in writing, that it is to be used solely for financing such a feeding experiment. Nothing can be lost if such an experiment fails. But if it is a success.....?

(to be continued)

(EDITOR'S NOTE: It would be an excellent idea if readers would contact their local newspapers with a view of having them reprint this whole series of articles of which there will be about seven or eight installments. No charge will be made.)

Bio-Dynamic Agriculture Conference

August 4th to 7th, 1949 — Threefold Farm, Spring Valley, N. Y.

Thursday, August 4th

Lectures: *Soil and Humus. What is Humus?* Our changing concept of fertile soils. Newest discoveries in soil studies.

Discussions: Soil problems, demonstrations of various soil types, with regard to the chemistry and structure of soils.

Friday, August 5th

Bio-Dynamic Farm and Garden Management. A field day with visits to bio-dynamic farms. Trip to Chester, N. Y. Picnic lunch at Dr. E. Pfeiffer's farm. Discussion of bio-dynamic results in farm practice: changes in soils, animal health and production. After return, visit to Threefold Farm.

Evening: Bio-Dynamic Association Meeting. Reports by bio-dynamic farmers and gardeners.

Saturday, August 6th

Lectures: The interrelationship of soils, plants, growth and health. Trace elements and vitamins.

Discussion: Inherent health problems as related to agricultural methods and soil treatment.

Sunday, August 7th

Lectures: The work of the bio-dynamic research laboratory. The processing of food with a view to maintaining its health value.

Visit to the Biochemical Research Laboratory. Demonstration of compost and manure treatment.

Lectures will be held at 9 A.M., 11 A.M., and 8:30 P.M. Discussions will take place at 3 P.M. and 5 P.M.

Speakers: Dr. E. Pfeiffer, Dr. William H. Eyster, Miss Evelyn Speiden, Mr. Ralph Courtney, Mr. & Mrs. Fred Heckel, Mr. Ernest Daniel, and others.

Apply to Mrs. Richard Kroth, Threefold Farm, Spring Valley, N. Y. for room reservations.

Table Arrangement

This table arrangement is contained in a beautifully designed and hand-made tray. Crumpled wire netting of coarse mesh in the tray serves as anchorage of the flowers which may be oriented in any desired position. The yellow daisies and lemon snapdragons contrast delicately with the lavender-colored stocks. The ivy forms the base and gives the arrangement an elongated effect. When used on a wall-table, the copper tray forms an interesting background for the light-colored flowers.

MISS HILDA TREBY

WINTER STORAGE OF VEGETABLES

By

DR. WILLIAM H. EYSTER

HOME-GROWN vegetables, organically grown and properly stored, are worth their weight in gold for good eating and good health. Vegetables and fruits are said to be organically grown when the soil contains enough organic matter to make it friable and when all the mineral elements which are required for growing plants relatively resistant to diseases and pests are present. Such plants need not be protected against pests and diseases by poisonous sprays and dusts. Such plants also provide the animals that eat them with all the minerals required for building strong bones, solid white teeth, good muscles, healthy internal organs, and a powerful coordinating nervous system. In brief, good whole foods free from all substances which are foreign to the nutrition of the body constitute the best health insurance in the world. Vegetables and fruits that mature at a season when they can be preserved by storing should be kept in their natural condition instead of being canned or dried. The processing of foods tends to destroy the vitamins and leach out the minerals which are so essential to our good health.

In planting a garden one should devote only a small portion to those crops that must be used as soon as they reach maturity. Fruits and vegetables which can be stored in their natural condition should be grown to the ex-

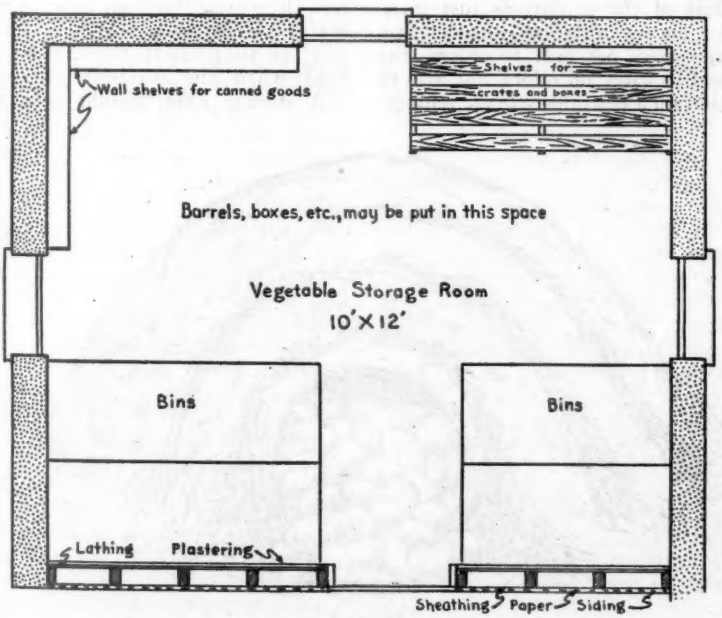


FIGURE 1

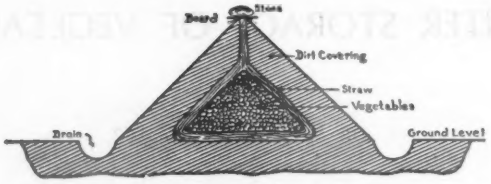


FIGURE 2

tent of the family needs for immediate use and for storage for winter use. The successful storage of foods for winter is not difficult. Many homes have good storage facilities or parts which may be adapted for storage of foods at little cost.

Facilities for Home Storage

Different fruits and vegetables require different storage conditions. Many vegetables lose water rather easily and will soon wilt and dry up unless they are stored in a damp place with a relatively low temperature; others, as some roots and fruits, require a dry, warm, well-aerated place; while still others, as beans, must be thoroughly dried before being stored. Regardless of the conditions just mentioned, good ventilation is needed in a storage space not only to change the air and to carry off odors, but also to help obtain a desirable storage temperature and exactly the right humidity.

The old-fashioned cellar was an ideal storage place for most kinds of fruits and vegetables. It contained no heat and had small windows to provide proper ventilation. A modern cellar includes a furnace for heating the house in winter and is called a basement. In a basement it is necessary to partition off a part, preferably with two windows, for the winter storage of foods. The partitioning wall should be well-insulated against the heat from the furnace. Many basements are L-shaped so that a storage space can be constructed by building a single wall. The windows of the storage room can be darkened to protect the vegetables from light, or they may be boxed in or shaded in such a way as to prevent the entrance of light when the windows are open.

A storage room should have wall

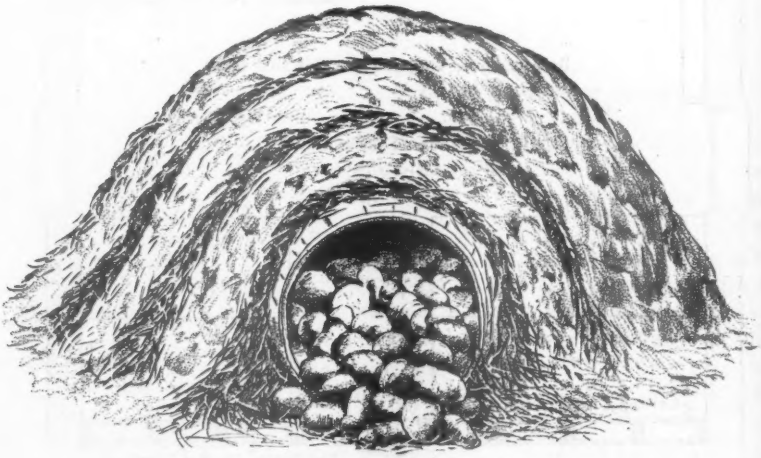


FIGURE 3
Barrel insulated with alternate layers of straw and earth.

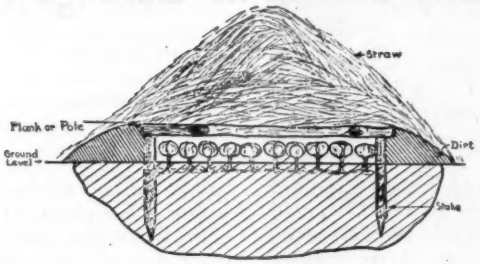


FIGURE 4

shelves for canned goods, shelves for crates and boxes, bins for root crops, and space for setting barrels and boxes, as shown in Fig. 1. (*Farmers' Bulletin* 1939). Movable containers, as barrels, boxes, and crates, are preferable to built-in bins, as it is possible to move them in order to keep the storage room clean and free from decaying vegetables.

It is possible also to have a storage room under some other building than the dwelling, but it must be well-insulated and well-ventilated. Outdoor storage cellars and caves are excellent for the storage of many vegetables and some fruits, especially potatoes, most root crops, and apples. All ventilators should be kept closed when the outside air is warmer than that in the storage room, and opened when the outside air is colder than that in the storage room, but not so cold as to be dangerous. Outdoor pits, or banks, are often used for keeping vegetables and sometimes winter apples and pears. A conical pit commonly used for the storage of such vegetables as potatoes, carrots, beets, turnips, salsify, parsnips and heads of cabbage is shown in Fig. 2 (*Farmers' Bulletin,* 1939). A well-drained location must be selected for making the pit. Make the pit about 8 inches deep and as large around or as long as necessary for the fruits and vegetables to be stored. It is well to line the pit with leaves, straw, or similar material, which should be brought up around the vegetables and extended at one or more places to the surface to serve as ventilators. The straw or other material should then be covered with 2 to 3 inches of soil. During cold weather, the trench should also be covered with straw, corn fodder, leaves, or manure to prevent freezing temperatures in the pit.

An old-fashioned storage pit for root crops and apples is made by burying a barrel in the soil. The barrel is then insulated with straw and soil. Then straw or leaves should be placed over the soil when cold weather arrives. A barrel storage is shown in Fig. 3.

Late cabbage and celery may be stored temporarily in special pits right in the field or garden, as shown in Fig. 4.

Store Only Healthy Uninjured Produce

Produce intended for storage should be free from such diseases as blights, wilts, and rots. It is a waste of time to store, for instance, badly blighted celery or potatoes. Care must be exercised to avoid bruises and skin breaks, and all injured specimens should be carefully removed. The storage conditions for vegetables are somewhat as follows: (1) *Cool and moist storage*: root crops, celery, cabbage, and potatoes; (2) *Cool and dry storage*: onions and dried seeds; and (3) *Fairly dry and moderately cool storage*: pumpkins and squashes at 50 degrees F. and 75 percent relative humidity, and sweet potatoes at 55 degrees F. and 80 percent relative humidity.

How a City Solved its Garbage Problem

By

F. D. STEINER, Consulting Engineer

THE old City of Berne (Capital of Switzerland) with its 150,000 inhabitants has been one of the first towns to make proper use of its garbage. From 1913 up to the present day the garbage has been composted on sandy soil belonging to the State penitentiary of Witzwil, about 20 miles from Berne. This plan was conceived by the late managing director of the penitentiary and vigorously sponsored by the city authorities. Years later, as the project proved its value, the University of Berne conferred an academic degree upon the man who pioneered the idea.

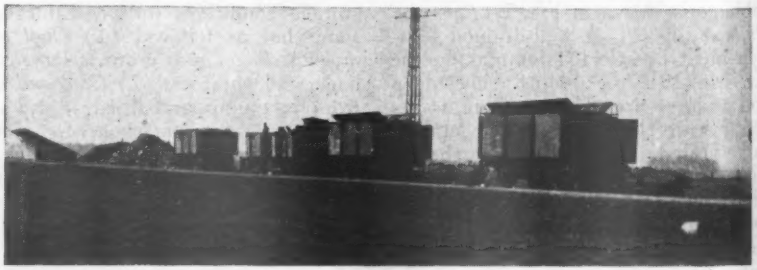
Not only were there hundreds of acres of poor, fallow land to be reclaimed and cultivated but the even greater task of reeducating the inmates of the penitentiary was to be tackled on a new basis. This manager had a sound knowledge of human nature and certainly knew the salutary effect of steady and constructive teamwork upon uprooted and rejected individuals whom he made to serve his purpose in a way that was called revolutionary in those days.

Half a century ago there was no machinery or equipment available for the proper handling and shipping of garbage and compost on such a large scale. To begin with, special railway vans resembling large containers had to be constructed, and new railtracks had to be laid to the places of destination. (See pictures)

In Berne the garbage is collected twice a week and taken to a special yard where it is immediately loaded into the vans and shipped the same day. An average of 1350 vans holding approx. 20 tons of compacted garbage are shipped throughout a year. Since its initiation some 1,200,000 tons of city garbage were turned into compost, converting over 400 acres of poor land into highly fertile soil with yields far above the average.

It must be said at this juncture that the shipped garbage does not include the whole amount. In most European cities, and particularly in smaller towns and villages, a good deal of garbage is used by citizens who cultivate small plots of land in their spare time to help stretch their food budgets. In Berne, persumably 10% of the total garbage is used in this way.

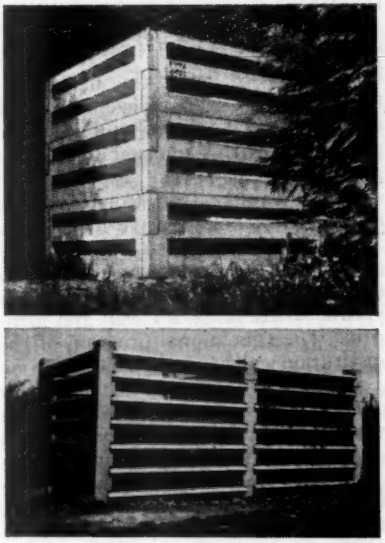
In 1939 the Government urged all citizens to increase the cultivation of fruits and vegetables in view of the oncoming war with its strangulating blockade and food rationing. The people on the whole responded to the official call beyond all expectation. Hundreds of lawns were broken up and converted into vegetable gardens. Besides tilling and cultivating, mostly with ordinary garden tools, compost



Cars for hauling garbage.

making was a topical subject. As farm-yard manure was expensive and hard to obtain, the inexpensive way of composting garbage was pushed to the limit. At tnat time new compost silos in reinforced concrete made their first appearance, breaking once and for all with the old and primitive method of composting in a pit. These silos are easily convertible and allow a maximum intake of oxygen and moisture so necessary for the proper and quick decomposition of garbage. Hundreds of these silos are now in use. They can be erected in half an hour, in single or multiple units, holding 2 - 3 cu. yds. each. As the compost is usually turned 2 - 3 times during its decomposition, at least one unit can always be kept free for fresh garbage while the other units are gradually filled with compost.

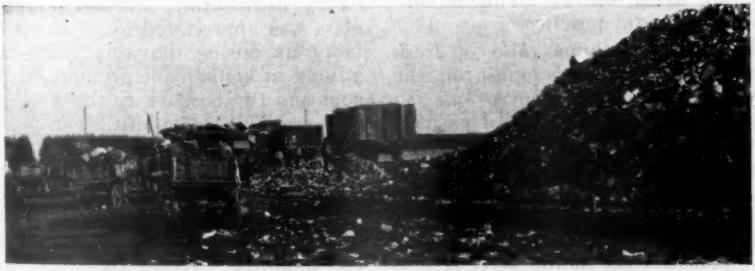
Pumpkins, squash, melons, cucumber, tomatoes, etc. thrive particularly well on pure compost. Those who aim at record crops plant their seedlings right on the compost heap and provide a grillage of sticks or wire over it in order to give the fast growing plants a hold and some protection. The first two pictures depict these concrete silos, one showing cucumbers climbing up a grillage. These plants grow with such exuberance that within a short time the whole silo is completely enveloped with foliage, thus providing a cool and shady place for the compost. In the autumn pumpkins weighing well over a hundred pounds can be carted home. Such is the reward of Nature for observing her laws. These neat and practical compost silos were particularly welcomed by city gardeners who were requested to keep



Compost Silos

their gardens neat and clean. Bad odors were avoided by sprinkling stone meal over the garbage.

In Witzwil penitentiary the unloading of the garbage is greatly facilitated by the special construction of the vans. One picture shows the huge heaps of freshly delivered garbage, which is first searched for objects that do not decompose or should not .be left in compost, such as metals, wire, cans, glass, etc. After careful sifting and extracting of all foreign matter the garbage is heaped up about 10 feet high. In order to aid decomposition the garbage is sprinkled with water, especially during dry weather. No other substance is added to accelerate



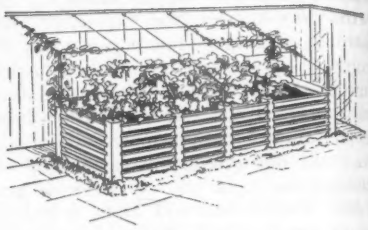
Organic materials for making compost.

the decomposition, although such substances are available on the market.

Anyone old enough to remember the methods of composting half a century ago may well realize the great deal of manual labor that had to be performed in this unusual task. The penitentiary can well afford to go slowly and thus refrain from investing much money in expensive machinery, as the inmates represent so many hundreds of willing farmhands ready to tackle any job. This procedure is advisable where labor is cheap and plentiful. The educational program of the institution calls for physical work on a constructive project. Under these circumstances it would have been unwise and wasteful to have the handling operations done by generated power and costly machinery. As the reclaiming of land took shape, an increasing number of inmates were transferred to cultivating duties and were equipped with modern tools.

The complete decomposition of the garbage requires about 2 years. In the early stages when the conquest of reclaimed land was peremptory, the garbage was not allowed to rot fully and was distributed after one year by horse-driven trucks on the far-stretched fields, spreading layers of a few inches at a time. (See page 25) It was considered good practice to plough it under immediately in order to speed up decomposition. This process was repeated several times until sufficient humus made cultivation possible. It is traditional in Europe to rotate cultivation according to a plan. This was also adhered to. Time and good care improved the soil. Dead leaves, stalks, etc. are never burned. This is considered wasteful practice.

Basing the volume ratio of fresh garbage to finished compost on the conservative figure of four to one (in other words, four cu. yds. of garbage produce one cu. yd. of compost), we can assume that the city garbage produced about 600 million pounds of compost since 1913. If this quantity is spread over 400 acres of land, it will be found that the humus layer is 5 - 6 inches thick.



Silo with cucumber vines.

During cultivation of the reclaimed land with plants including cereals, potatoes, vegetables, the composting of waste matter is meticulously observed and the soil is in parts enriched with farm yard manure from domestic animals of the institution.

The extraction of foreign matter from fresh garbage is an interesting and revealing chapter. The extracted stuff constitutes about one tenth of the total garbage, and to enumerate the various objects retrieved from the rubbish would be a lengthy task. The most common objects are newspapers, rags, cans, metal parts, tires, old shoes, bottles, glass, bones, brass, copper, zinc, lead, aluminum, wood, and even silver, gold, precious stones and alarm clocks are not uncommon objects in the Bernese garbage. It has once been said that the quality of a garbage is a good measure of the standard of living. According to that statement, the Bernese are not so badly off in spite of the meager years of restriction and rationing during six years of war.

From the beginning it was decided to make the best use of the extracted material. Newspapers and rags are sold to papermills, metals find the way into foundries, bottles are collected by distributors, and even broken glass was appreciated by glass manufacturers during the war. Bones are ground in home-made grinders on the spot and turned back to the compost. Wood and other combustible stuff (except paper and rags) is used as fuel in furnaces. The ashes are invariably retrieved and composted.

It can be readily seen that the extracted material represents a formidable quantity (about 1000 tons per year). In order to reduce its volume,

all compressible parts, such as cans, wire, tubes, and other metal parts are compacted into standard cubes by home-made presses before they are shipped to the mills. The management is particularly keen in having all newspapers removed from the garbage before composting takes place, because they are found to be detrimental to compost and plant life, probably due to printers ink.

During the war Switzerland was completely shut off from the rest of the world and it was during those trying years that the city garbage yielded the greatest percentage of compost-producing ingredients. This could be directly traced back to the numerous salvaging campaigns by school children and junk dealers who extracted the valuable and usable parts from the garbage before the shipping. At that time these objects were rated highest on the market and even old bicycle tires fetched a price, as rubber was one of the rarest articles in the mountain republic. These salvaging campaigns were carried out periodically and with short intervals under the supervision of city officials, not only in the Capital, but throughout the country. Unbelievable quantities of all sorts of materials were rescued and turned back to industries for re-use or adaption.

As the compost plan took shape and the arable land extended over greater areas, producing record crops, the Witzwil penitentiary soon became financially independent, selling a good surplus of its products to wholesale and retail houses. This independence and the active balance sheets of the institution are unique and even today stand out as extraordinary. There are few penitentiaries indeed that are a financial and moral help to the State.

The Witzwil penitentiary takes care of men who are found to be wanting in some of the essential virtues. Criminals are not admitted. It is a well known fact that men go astray because of lack of education and training in youth. Such men are in need of re-education, hard work and sound training. It is also true that work on the land is very conducive to character building. Small wonder why so many men in elevated positions spent their youth in the country. After serving their terms, the inmates of Witzwil seldom revert to their former failings, a proof that life with a healthy out-of-door occupation is still the best bulwark against crumbling morals.

The Witzwil experiment is highly educational; it has its own work- and repairshops and manufactures most of its tools and equipment. Therefore it is always in need of good craftsmen. The inmates are occupied according to their abilities. Men used to sedentary work are not spared the exertion of manual work, although they are adjusted to it by degrees. Most of them discover a real satisfaction through their tasks and get attached to the place. This explains why there are no escapees recorded in the annals of Witzwil, although inmates are often working miles away in the fields without supervision. Nothing indeed could speak more vividly for the system as employed there.

Cars used for hauling garbage.

Miscellany . . . . . .

The new cattle disease, termed "X", which has been wiping out some herds is believed to be caused by the overuse of chemical fertilizers, thinks Dr. W. D. McElroy, research scientist of John Hopkins University.

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A DOCTOR SPEAKS

Here is an interesting letter which recently appeared in the *N. Y. Times* (May 29, 1949). It shows that the thinking of agriculturists must be guided by health and medical angles:

To the Editor of The New York Times: I read with interest the report about Prof. Eugene G. Rochow in "Science in Review" for May 15, 1949. Professor Rochow believes that the world can support a population of 15,000,000,000 if we make the most of the chemical knowledge that we have. He says our chemical knowledge will enable us to grow enough trees and convert the wood to sugar for human consumption.

Rochow also predicts that meat and eggs will disappear from the diet because a beef steer converts only about 12 per cent of its food into meat and does worse when poorly fed.

I do not doubt that chemistry will be able to convert wood to sugar and synthesize protein-like products from "fixed nitrogen" for human consumption. My purpose in writing this letter is to point out a pitfall in taking knowledge obtained in the field of chemistry and applying it to human nutrition without considering facts obtained in clinical medicine.

Research in human nutrition during recent years definitely indicates the superiority of animal protein foods, such as meats and eggs, over all other foods. Further, there is strong evidence indicating that sugars are not only inferior foods but may also be harmful to the human organism. These conflicting concepts show the need for circumspection on the part of scientists in applying knowledge obtained in their own specialized fields.

The researcher in chemistry knows little or nothing of clinical medicine. It is not expected that he should. Clinical researchers are not expected to be chemists. We have biochemists with medical degrees who know little of clinical medicine. Specialization is a necessity. However, the stores of knowledge gained from highly specialized fields of research must be applied with the wisdom that comes with broad knowledge and understanding.

We need men who will make every effort to acquaint themselves with facts derived from varied fields of research. Such men will be faced with a Herculean task. But it is obviously essential that we have men who can survey wide areas of knowledge and correlate isolated facts.

Benjamin P. Sandler, M. D.
Oteen, N. C., May 21, 1949.

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AN ORGANIC FARMER CHAMPION

While we are on the subject of letters, here's one that James Street, the famous best-seller author of the *Gauntlet* sent to a North Carolina newspaper. The name of the newspaper, unfortunately, did not accompany the clipping:

To the Editor:

A casual investigation by your correspondent Tom Henderson of Yanceyville would show him that organic farming methods are not confined to Republicans or Democrats. Incidentally, Governor Scott now is reading "Pay Dirt," the best book next to Darwin and Albert Howard on organic practices.

It is not politics that is ruining our soil, but profit pressure and, as a Democrat, I am constrained to look askance at Republicans when profit idolatry is mentioned. Organic farming comes down to a simple fact—is man willing to live on the dividends of the earth instead of the principal. Perhaps Republican Henderson is, but Republican Wherry is not; perhaps

Democrat Street is, but Democrat Hoey apparently is not. So be it!

Also, tobacco can be grown organically free of disease, but it won't be "bright" leaf. It will be a fat, lush weed and not the kind of tobacco that will send radio droolers into ecstasy. It will have the trace elements in it and will not be a remedy for everything from spinsterhood to stupidity.

JAMES STREET

Chapel Hill, N. C.

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NEW VARIETIES

In the April 30, 1949 *Science News Letter* appears an article *Hardy Plant Parents Hunted.* The sub-heading is *Disease-resistant varieties of flowers and vegetables are being sought around the world so that they can be crossed with commercially popular varieties.* In the last twenty to thirty years a great deal of difficulty has been encountered with the dying out of the potency of seeds produced in our chemical methods of farming. They do not germinate sufficiently to give high yields. A new variety will produce for a few years, then it will gradually decline. The new variety may be disease-resistant but soon it loses that quality.

Then science produces a new variety to take the place of the old. How is it done? Scientists usually go to some primitive country and their hunt takes them all over the world. The article says, "They search for cantaloupes in India and Iran, for peas and watermelons in Africa and the Near East. To many parts of Asia they travel for onions, to South America for tomatoes, to Central and South America for beans and sweet potatoes, and to Europe and South America for Irish potatoes." Sounds glamorous, doesn't it? Note that they go to primitive places, where practically no chemical fertilizers are used. If such places were not available, the blight would wipe out whole crops as a regular thing and eventually it would be impossible to grow anything under our present commercial conditions.

In these unsophisticated countries the soil organisms have not been reduced to the vanishing point by, not only chemical fertilizers, but by the poison sprays such as the deadly copper sulphate, DDT, 2-4 D, etc. Evidently the soil has something in it that gives the plant health to resist disease and even insects. But now, a strange and a deplorably stupid thing is happening. Our scientists in taking something from these countries, desire, in their gratitude, to repay them in some way. How? By teaching them to use chemical fertilizers, so that now in Guatemala, in Mexico, in El Salvador, the footsteps of the chemical fertilizer salesman are regularly heard in the land. This is especially true in Mexico where of late the peon is getting to completely depend on the chemical fertilizer bag. This suits him nicely. It is much easier to merely empty a bag than to prepare a compost.

But what will happen in another twenty or thirty years? When Dr. X of the agricultural department goes to Nicaragua to search out a native variety of some plant to be used in manufacturing a new hybrid he will sadly discover that all the native varieties have lost a part of that potent quality to procreate the species. They will not be good enough for his purpose. There is an old Arabian proverb "A tree that affords thee shade, do not order it to be cut down."

Fortunately, twenty years from now there will be so many organic farmers and gardeners, that perhaps the scientist with a little humility, will go to them to secure his foundation stock, and I am saying this in all seriousness So, remember, you organiculturists, the world is dependent on you to preserve the spark of plant life, to keep it alive, to hold the torch, for civilization so to speak. Look to your soil.

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GUATEMALA INDIANS

Dr. T. Dale Stewart, curator of anthropology at the Smithsonian, has measured 200 western Guatemalan Indians of Mayan stock and compared them with skeletal remains of their forebears. He found that the modern

Indian is two inches shorter than his predecessor of two centuries ago. He speculated that it was due perhaps "to a loss in the soil of some element needed in traces in the human diet." Perhaps our agronomists will tell them that they can gain back this height by using chemical fertilizers.

The children of Japanese who have migrated to California are inches higher than their parents. Perhaps it *is* due to food raised with chemical fertilizers, but it does not follow that mere height or bulk means health. I *do* know that real tall people do not live as long as those of medium stature. There should be some tests of the content of the human body, its vitamin and mineral makeup, to indicate the status of its general health. We have one, that indicates the condition of the blood such as anemia. Here is a new field for medical investigation.

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DO ARTIFICIALS GIVE GREATER YIELDS?

The advocates of the use of artificial fertilizers would have us believe that the use of such fertilizers increases yields. It is interesting therefore to read an item which appeared in "The Register of California" for 1857:

"The returns of 22 counties exhibit 14,703 acres planted with vegetables. It is probable the remaining counties will increase this amount to about 45,000 acres.

"The following specimens exhibited at state agricultural fairs of 1855 and 1856 are inserted as evidence of the capacity of soil in California.

"Two pumpkins, from Sacramento, weighed 210 and 240 pounds; a beet grown by Col. Hall of Sacramento City, weighed 73 pounds; a carrot weighed 10 pounds, measuring one foot and eight inches in circumference, and three feet, three inches in length—there were 50 in the same bed of equal size. The seeds were sown on June 25th, and the carrots dug Sept. 20; a tomato 17 inches in circumference; a squash weighing 141 pounds; an onion weighing two pounds and 15 ounces, and measuring 22 inches in circumference; a cornstalk 21 feet, nine inches in height; watermelons from near Nevada —27 gave an aggregate of 550 pounds; a sweet potato from San Jose weighing 11 pounds, two ounces; an Irish potato from Bodega weighing 7¼ pounds; a bunch of potatoes of the Oregon red variety from a single eye weighing 10 pounds, grown at the forks of Turnback creek near Sonora; grapes —several bunches weighing over four pounds each; peas, second crop fine and good from Los Angeles; a citron lemon, 16½ by 18¾ inches in circumference, weighing two pounds, 14 ounces, from Los Angeles; fig trees—a slip one foot in length and ⅝ of an inch in thickness was planted April 1 and in the month of September following was 11 feet, six inches in height and 9¼ inches in circumference at the base, with a corresponding growth of branches; peach trees in 28 months from the planting of the seed bore fruit over nine inches in circumference and weighing from 7 to 8½ pounds—there were 34 of these large peaches on one tree; an apple measuring 15 1/3 inches each way, weighing 23 ounces grown in the Yamhill orchard. "

And that fifteen inch apple was grown, no doubt, without any poison sprays. In contrast to this, look what's happening to the Valencia oranges of today, shrinking almost to the size of golf balls.

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TEETH

Dr. Arnold E. Stoller, Chairman of the Seattle Committee for the observance of the nation's first dental health day, Feb. 1949 said, "The teeth of Americans are decaying six times faster than dentists can repair them." I met an Italian recently who told me that when he came from Italy ten years ago he had a perfect set of teeth. In the great land of technology and the Atom Bomb he has thus far lost all but about eight or nine of them. What's the answer?

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NATURE'S ORANGE WATER

In the June *Reader's Digest* there is a laudatory article about a new method

of extracting the water out of oranges, freezing the rest and canning it. Millions of cans are being sold to an unsuspecting public. All they have to do is add 3 pints of sink water, treated with chlorine and sometimes with alum or even worse chemicals, to each pint of the concentrate. Think of it! Nature has gone to a great deal of pains to produce the most wonderful, mineral-laden water in the orange. Then man comes along and sends it all down the drain, merely to make a dollar. Then *Reader's Digest* comes along and helps to glamorize the product. Isn't it enough to make you jump on your derby?

Yes. And Bing Crosby is one of the capitalists who helped finance the process. People drink this dopey orange juice, and don't get the healthful effect they should out of the orange. They become sick and don't go to the movies. So where is Bing Crosby's wisdom in investing in such a product?

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THOSE EARTHWORMS AGAIN

Leonard Wickenden writes us of the voluminous mail his articles in *Organic Gardening* brings him. One man solemnly suggested to him that all earthworms ought to be eradicated because they eat up the organic matter in the soil.

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SEWAGE

Here is an item from the Glendale (Calif.) *News-Press* of April 9, 1949:

"A revolutionary proposal that the city back a "supercharged sewage" plant which would produce a high energy fertilizer has been laid before the City Council by William Hill Barton of Glendale.

"In a letter written the council this week, Barton asked that his plan be given a public hearing in the council chambers to which councilmen, members of the Board of Education, the Chamber of Commerce, the manager of the California State Employment Service and the chief librarian of the Glendale Public Library be invited.

"Barton's plan is based on the carbon cycle of nature and the disposal of sewage and garbage in water.

"He would get the chemistry department at Glendale College to build a series of three tanks for his experiment. Into a mixer tank goes raw sewage, and when mixed, the sewage is passed to a second tank charged with electricity.

"The supercharged sewage is then piped into a third tank on which water hyacinths are grown. The sewage water is used for irrigation purposes and the ground-up hyacinths are used as a high energy mulch and applied to all growing crops from lawns to vegetables.

"The request was relayed by the council to the city manager for investigation and report."

William Hill Barton is a reader of *Organic Gardening*.

J. I. RODALE.

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LAWNS AND LAWN GRASSES

WHEN TO PLANT

In the North it is best to seed a new lawn from late August to late October, because grasses grow in the cool weather of fall and become well established before spring. If the lawn is to be a mixture of grasses and clover, such a mixture can be purchased. Some persons plant the clover the following spring. The inclusion of clover will make a heavy cover and inhibit the growth of quack grass and other weeds.

There are certain definite advantages of fall seeding, as follows:

1. The warm soil, adequate rainfall, and cool nights combine to establish an ideal growing condition for lawn grasses.

2. Fall sown grasses root more deeply. Also the plants tend to stool more freely and thus produce a thicker, healthier sod. Fall grown plants develop more extensive root systems and are thus able to better withstand dry, hot weather of the summer months.

3. Fall is a dormant period for weeds. During their inactivity, the lawn grasses have a chance to establish themselves without the competition of weeds.

4. The soil can be more easily prepared in the fall than in the spring. In the spring the soil is usually too wet to prepare in time to give the lawn grasses a start ahead of the weeds. Also spring soil is so cold that the seeds will germinate more slowly than in the warm soil in the fall.

HOW TO MAKE A LAWN

Do not work the soil too deep. A good stand of grass can be obtained even in two to three inches of topsoil, if drainage is good. A liberal application of compost and other organic matter such as peat, etc. will help the drainage problem. If the drainage is too good (a gravel soil) more compost should be used. Sometimes clay is mixed in, in such a soil. In a heavy clay subsoil, a pick-axe can be used to stir it up. The compost should be placed in the upper two inches. If soil is infertile a green manure crop can first be planted such as rye, vetch, clover or soy beans and worked into the soil preparatory to making the seed-bed. In remaking an old lawn incorporate the old sod into the soil. A lawn prefers a slightly acid soil. Do not use lime.

PLANTING SEED

Rake the seed gently into the soil, if possible using a wooden rake. Not more than 20% of the seed should remain uncovered. There is an automatic seeder on the market which is excellent. Inquire in hardware and seed-stores. Include clover in the mixture if your soil is poor. As to variety of seed it is best to make inquiry at local sources, because conditions differ regionally.

WATERING

At first give it light daily sprinklings, using a mist water spray so as not to wash out the seeds. Then be sure that enough water is given each time to penetrate into the subsoil. Lawns may be watered in bright sunshine.

MOWING

At first let the grass grow to about 4 or 5 inches before mowing. It is a good practice to let the clippings lie on the lawn to furnish additional humus unless it is too heavy or clumpy.

During hot, dry months do not mow the lawn too short. During this time, however, it is important to prevent aggressive weeds from going to seed.

ROLLING

Roll the lawn in the spring as soon as all frost is out of the soil. Rolling helps to level the soil and thus facilitate cutting the grass. Its chief value, however, is to press the roots, lifted by alternate freezing and thawing, back into the soil. It is best to use a light roller for this purpose. Depressions in the soil should be filled up with a good loam enriched with compost. If the soil is heavy clay, rolling might compact it further.

WEEDS

A poor lawn breeds weeds. A lawn that has bare spots (be sure to re-seed) and that is too alkaline will encourage the majority of weeds. Unless you know that your lawn is too acid never use lime in any form on it. A planting of clover will keep out weeds. Many persons are plagued with quack-grass. In this case the grass should be clipped close, preventing the weed from going to seed. If sufficient compost is used the lawn will grow so vigorously that quack grass will be greatly discouraged. By fertilizing the lawn with compost heavily in the fall the grass will get an early start in the spring and occupy the ground so completely that quack grass which spends the winter in the seed stage will be controlled to some extent. Rake the lawn in such manner that the stems of the quack grass are elevated sufficiently to be cut off by the lawn mower. Quack grass can also be killed out by crowding. It cannot stand the shade of crowding plants. If the lawn is too overrun with crab-grass it should be entirely remade.

Here is the best method we have heard for the elimination of quack grass on a lawn. One of our readers writes:

"On Long Island I had a lawn that was nothing but solid crab grass when I took over the place, and within three years I had entirely done away with the crab grass without either reseeding or using any chemical fertilizers. I applied cottonseed meal very heavily just as soon as the frost was out of the ground in the spring and the natural grass got such a good start that with the aid of the clippings, which I always left on, I soon had the crab grass choked out."

WEED KILLERS

More and more chemicals are being introduced as weed killers. And the sad part of this introduction of chemicals as weed killers is that an increasing number of thoughtless or uninformed people are using them to kill weeds. In fact, groups of people regard themselves as specialists and make weed-killing with chemicals a business. Chemicals which kill weeds are almost sure to kill the beneficial soil organisms. The poor earthworm certainly takes a beating all along the line. But the earthworm is not alone in this, because the soil also contains billions of bacteria, actinomycetes, yeasts, fungi, and a great variety of animals all of which play an important role in the soil in converting plant and animal remains to compost. It does not require a high mentality to realize that these chemicals are injurious to soil and health.

Fuel oil is sometimes used to control weeds. We advise strongly against it.

WHEN TO APPLY COMPOST OR OTHER ORGANIC MATTER

Organic fertilizers should be applied to lawns in the autumn, never in early spring or winter.

HOW TO USE COMPOST FOR LAWNS

Since ordinary compost is much too lumpy or coarse for use on lawns, it should be thoroughly ground up. This can be done by placing the compost on a wide board and working it back and forth with a hoe until it is shredded exceedingly fine. Then it should be worked through a sieve (about ½ inch mesh) and the sieved portion spread on the lawn, the coarser residue being applied to the vegetable patch, or again worked by means of the hoe until it is shredded much finer.

OTHER ORGANIC FERTILIZERS

Bone meal, dried blood, granulated peat moss, light sprinklings of sawdust, spent mushroom soil finely ground, soil from the woods which is usually on the acid side, cottonseed meal, cocoa shells, coffee grains, etc. may be applied in the fall. Sewage sludge if well-dried and ground is excellent.

No special composts need be made without lime. The regular compost is neutral and good for lawns.

WHAT CAUSES MOSS ON LAWNS?

This does not necessarily indicate an acid soil and lime should not be applied. It shows that the soil is in-

fertile and needs heavy applications of organic matter. It also indicates poor drainage. The soil should be reworked to a depth of two or three inches and compost applied. Bone meal and dried blood would be excellent. Moss grows especially in shaded areas.

FOR SHADY PLACES

Apply heavy applications of compost, bone meal, etc. on shady lawns. Special shade grass seed is required for such locations. If great difficulty is experienced in maintaining a good lawn in such a place, other plants should be grown such as creeping myrtle (*Vinca minor*), pachysandra, Christmas Rose, creeping yen, English ivy, and honeysuckle.

See our booklet—*Weeds and What They Tell*, $1.00.

STABILIZING GROWTH WITH MULCH

By

WINTON H. REINSMITH

Landscape Architect, U. S. Forest Service, Atlanta, Georgia.

IT'S amazing how trees, shrubs and perennials here in the South become stabilized, grow more steadily and maintain good color of foliage when they are mulched and kept mulched. At first the addition of the mulch does not seem to have any nutritional benefit, although of course it conserves the moisture in the soil. Equally important here in this "frying" sunlight, from May to October, is the shading of the soil by the mulch. Ground left bare either bakes, cracks or, if of loose texture, becomes dusty dry in an incredibly short time during dry spells in summer. The ideal to have ornamen-

Mulching conserves soil moisture.

Mulched Tomatoes.

tal shrubs and trees on their own feet as one finds the natives in the forest is not unreasonable; in fact, success in such establishment is easily attainable.

Although blessed with many, many trees and consequent annual heavy leaf-fall, the South has for decades observed a general practice of tilling the ground bare, even sweeping homegrounds and courthouse plazas with brushwood brooms, burning leaves, grass and other vegetable litter as "trash." It is relatively harder to build up a humus in the topsoil here than in the North, because so much heat and moisture breaks down vegetable detritus rapidly and it oxidizes or leaches away. But there is such a thing as applying *enough* mulch, and replenishing generously, at least once annually.

The gardeners have shown the way, with their camellias, azaleas and certain other ericaceous plants. They all come to know that these plants require peat or leaf mold on the acid side, that they are not to be hoed or dug around and that the top layer must remain moist and cool. Most amateurs still hold out for the shady places to grow these floriferous broadleaf evergreens; but it is true even in the South that full sun is as good as or better than shade, provided heavy mulch is used to protect and nourish the roots. Slowly, all too slowly, the application and perpetuation of mulch to shrubberies in general and to flower beds is taking place, with a gratifying reduction of weeding, watering and, of course, fertilizing. Best result of all, however, is a steady, slow growth, a promise of an end to the fit-and-start, feast-and-fam-

ine cycle manifest on so many home places where in spring fervor the home gardener lavishes the commerical fertilizer, then in late fall has to whack down the tall sprouts that have grown to the cornice.

Although approximately all garden writers and lecturers subscribe to it, the compost pile is a scarce article in southern suburbs. There is usually a catch-all trash pile where grass clippings and old stalks accumulate, but these often are consigned to the flames when the pre-Christmas or the early spring clean-up fever strikes. Of course the vegetable residue from such trash piles does not compare with the product of scientific or reasonably careful composting, which should be used as an adjunct to mulching and for preparing holes or beds for new plantings. Spreading compost or manures over the ground, then spading or plowing in as a basic preparation for lawn is another rarely witnessed practice. But the practice is growing, some few are leading the way.

In this land of dense forests and lush hammocks where the natural growth is lustrous, largely evergreen and stable, it is an anomaly to see city and country yards, over-planted to begin with, often looking so starved for water and food and so stalky with gangling overgrowth, and to hear at the same time the plaints about the high fertilizer and water bills. Perhaps the application of mulch and compost, and periodically more mulch and compost might not correct the situation wholly, but from my observation and experience it would go a long way. Such practice, like charity, must begin at home.

COLOR COMBINATION WITH PHLOX

By

E. I. WILDE

Professor of Ornamental Horticulture, Pennsylvania State College.

THE hardy phlox, in a perennial border, carries the burden of display in midsummer. It is most gorgeous in July and early August, a period when there is a scarcity of hardy flowering plants. The secondary clusters of flowers from axillary branches extend the display for several weeks but often it is skimpy and shabby. It is not comparable to the primary July showing.

No other perennial can match its concentration of color and its value in creating bold, massive and emphatic points of interest. This impressive asset is also its weakness, for the quantity of color and the color itself make it the most difficult subject to use. Many of the colors have the intensity of the solar spectrum and all have varying amounts of violet in them. These are the reasons why the reds clash with the warm red, orange and yellow of other plants.

A pleasing combination of the analogous colors of phlox in the garden cannot be arranged as in a bouquet, where rhythm is secured by variation in form and weight of flower clusters. It is almost impossible to create a proper balance with the heavy masses of color or to concentrate on focal points, as each is striving for dominance.

Phlox drummondi

The proper choice of color often lifts a garden from mediocrity to a noteworthy individuality. Color reflects the mood of the garden and its owner; it is something that always appeals to us. Direct complementary colors or opposite colors bring out each other's value more vividly than any other combination. A practical application of this principle is the planting of violet purple phlox with the lemon calendulas, yellow daylilies, *Oenothera missouriensis* (Sundrop), and dull yellow gaillardia (Mr. Sherbrook). The complements of violet-red and nearly true reds are yellow-green and green, respectively, both of which must be supplied by foliage. The true scarlet will clash with the phlox varieties because, while both are reddish, the pull of the scarlet is toward orange and the pull of violet-red is toward violet.

In a mixed border, light tints and white will always harmonize but a garden of this kind lacks character and individuality. Dark colors, on the other hand, offer sharp contrasts and points of emphasis. They should be used sparingly, however, and in just the right ratio. Remember that greater amounts of a light color are necessary to balance a dark one. Vivid colors are reserved for focal points (bright spots in front of evergreens to terminate a vista) or for masses on each side of an entrance.

Phlox is most effectively displayed among plants having contrasting habits of growth, leaves that differ in form or color, and varying flower clusters, as spikes and loose panicles. The companion plants should be taller or shorter so that their flower clusters do not impair or detract from that of the phlox. A garden planted largely to phlox becomes dull and tiresome because of constant repetition of like forms. Plants with gray foliage and those which appear light and airy help to break this monotony.

A suggested list of companion plants for the background which will offer little color contrast are *Gypsophila paniculata, G. acutifolia, Thalictrum glaucum, Euphorbia corollata, Aconitum napellus, Artemesia lactiflora, Campanula persicifolia, Salvia farinacea* (Blue Bedder), *Lilium regale* and *L. tigrinum*. For the foreground there are *Dicentra eximea, Stokesia, Lavandula, Stachys lanata,* annual phlox, garden pinks, petunias, *Campanula carpatica, Polemonium* (Blue Pearl), *Aster amellus* (St. George), and verbenas.

The most satisfying results are obtained when group plantings of phlox of one color are made in three clumps to a small border and five clumps to a large one. There is no end to the interesting combinations in which phlox may be used. Miss Lingard makes excellent companions of *Heuchera sanguinea* and *Salvia pratensis*, or of *Anchusa italica* and *Campanula carpatica*. A little later in the season whites are spectacular with *Hemerocallis* when planted about statuary in front of evergreens. The brilliant Harvest Fire, Spitfire and Leo Schlageter combine well with *Lilium regale* and Baby's Breath or Thalictrum combines well with Stachys. The rose pinks will blend with carnations, petunias and light violets, purples and lavenders. Salmon Beauty or any other so-called salmon variety is difficult to handle. However, try it with annual phlox and misty appearing plants such as *Artemesia lactiflora* or Silver King or the light shadow colors.

The final recommendations are that the mass of phlox be proportioned so that each will be forceful and that white be used plentifully in the garden for the dual purpose of reconciliation and for intensification of existing color.

Botany For The Gardener (21)

By

DR. WILLIAM H. EYSTER

MOSSES

THE true mosses, the *Bryales,* are widely distributed in our environment and occur in such varied places as on the soil, on rocks, on decaying logs, on the bases of trees trunks, in ponds, and in streams. The moss plants which we see are really sexual branches which bear in their tips the sex organs. In many species the sexual branches, or moss plants, occur in such closely crowded colonies that they form cushions. The moss plant consists of a central stem which bears spirally arranged leaves. The stem and leaves are much more simple than those of seed plants with which we are more familiar. The leaves, for the most part, consist of a single layer of cells.

The male and female sexual branches of a common moss are shown in Fig. 57. In the female branch, Fig. 57 A, the leaves at the tip of the plant are not visibly different from those on the side of the stem. These terminal brush-like leaves are adapted for receiving water containing the sperm which is splashed from the male plants. The leaves around the tip of the male branches are broad and flat and form a flower-like structure, as shown in Fig. 57 B. This flower-like structure is really a splasher.

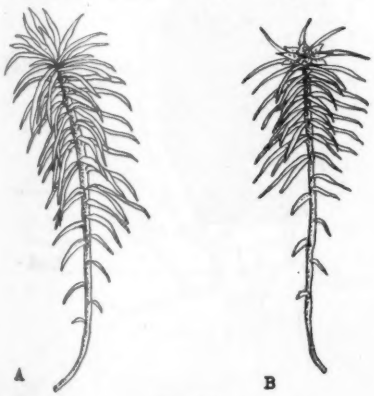


Fig 57

In the tip of the female branches is formed a cluster of female sex organs or *archegonia,* one of which is shown in Fig. 58 A. This sex organ has the general shape of a flask or tenpin. The enlarged hollow base is called the *venter* and produces the egg. The long *neck* is made up of an outer wall of cells around the central canal cells like the wood around the lead in a pencil. The central canal cells break down when the egg is mature and thus make a central canal from the tip to the *venter* of the sex organ. It is through the canal formed in this manner that the sperm enter the female organ and fertilize the egg.

In the tip of the male sex branch is a cluster of male sex organs called *antheridia.* A single *antheridium* is shown in Fig. 58 B. Note that it consists of a stalk and balloon-like body differentiated into an outer wall and a central cavity filled, when mature, with sperm. The mature *antheridium* splits open to release the sperm. The released sperm swim about in a film of water on the leaves of the flower-like pavilion on the top of the male sexual branch. From here they are splashed

by rain water to the female sexual branches where they enter the *archegonia* and fertilize the eggs.

The fertilized egg grows into a parasitic, spore-producing plant which lives permanently in the tip of the female sexual branch. The very tip of a female sexual branch with a parasitic spore-producing plant is shown in Fig. 59. Note that the spore-producing plant, often called a *sporophyte*, is differentiated into a foot which is an absorptive organ and thus functions like a root, a leafless stalk, and a terminal spore capsule or *sporangium*. In the spore capsule are produced the spores which eventually are shed, fall to the ground, and grow into a new sexual plant. The spore capsule is such a beautifully constructed and efficient plant organ that it is worth examining a little more in detail. As shown in Fig. 60, the capsule consists of an upright, square, rectangular box covered with a lid called the *operculum*. This lid fits on the spore capsule like the lid on a sauce pan. When the spores in the capsule are mature, the lid falls off and exposes an inner cover held in position by a series of teeth around the periphery of the opening. The stalk then becomes recurved so that the open end of the capsule is directed downward in order to allow the spores to fall out. The teeth are sensitive to moisture changes in the air, so they move in such a way as to cause the spores to be spilled out of the capsule.

Each spore is capable of growing into a microscopically small alga-like plant called a *protonema*. The *protonema* is differentiated into rhizoids and vegetative cells, the latter giving rise to a number of buds which develop into male or female sexual branches. A *protonema* of a common moss is shown in Fig. 61. The buds shown on the *protonema* will grow into sexual branches which have already been described and are illustrated in Fig. 57.

Economic Value of Mosses

Mosses may be regarded as pioneer soil builders. They gain a foothold on bare rock where they grow and their dead parts are converted into compost. This compost accumulates until it is present in sufficient amounts to sup-

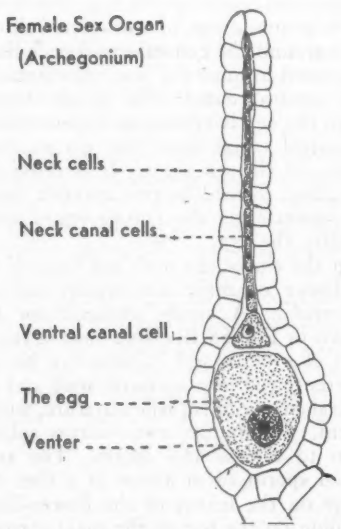


Fig 58 A

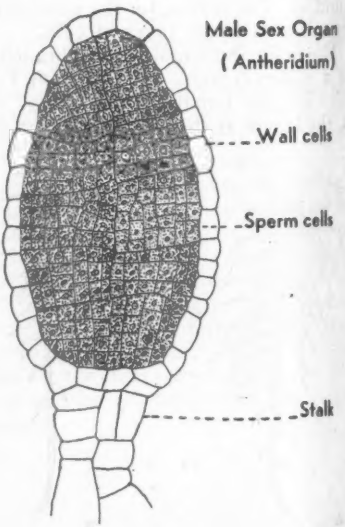


Fig 58 B

port the growth of such larger plants as ferns and seed plants. Mosses also absorb and hold moisture and prevent erosion of the soil.

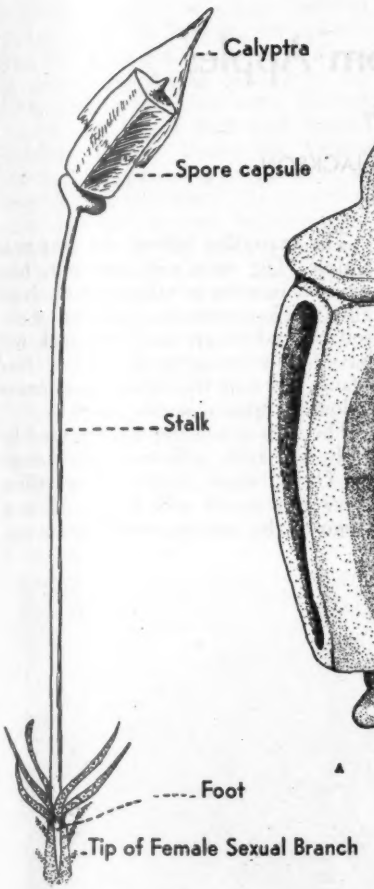


Fig. 59

Parts of a Moss Spore-producing Plant

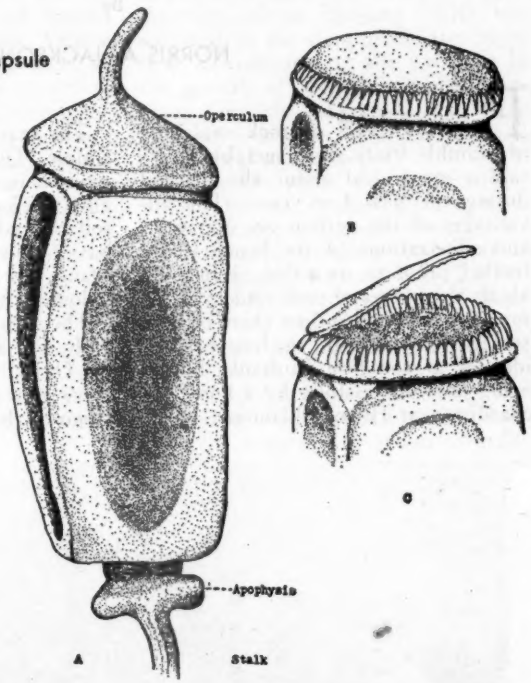


Fig. 60

Mosses growing on the soil in lawns or gardens are indicators that: (1) the soil is acid, (2) the soil is deficient in one or more of the nutrient elements necessary for the normal growth of higher plants, or (3) the soil is too wet, due to poor drainage.

Rock Mosses

The rock mosses, the *Andreaeales*, belong to the single genus, *Andreaea*, and are small brown mosses which generally grow on rocks. They may be distinguished from other mosses by their repeatedly forked stems and smaller size.

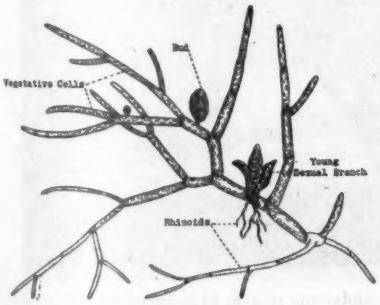


Fig 61. A moss protonema

Rock-Bottom Apples

By

NORRIS A. JACKSON

PROPONENTS of rock mulching of bramble fruits and vegetables have said a great deal about the method during the past few years. The advantages of the system are apparent, and illustrations of its benefits add further proof to its value. But what about the values of rock mulching *below* the ground, rather than on the surface? No, this isn't the hare-brained idea of a would-be Burbank, but is being used successfully by a home orchardist near Hugo, Oklahoma.

The reasoning behind the system is simple. Dig up a rock and note how moist it is, even in mid-summer. Note also the looseness or pliability of the soil around the rock. That rock will have moisture around it the year round, even in the driest of summers following normal spring rains.

The idea is one reportedly used by early-day apple growers in the Arkansas Ozark apple region. A travelling stove repairman told L. R. Allen of Hugo of the system several years ago.

A large rock was placed in the hole under the tree at planting time.

It involves the use of a huge stone at the bottom of the hole dug for the setting. Mr. Allen pondered over the idea for several years and decided to try the method in the fall of 1945. He had ordered settings of Red and Yellow Jonathan apples. Under the Yellow Jonathan he placed a huge rock, as large as he could carry. It measured about two feet by one foot by eight inches—a pretty big load for an aging man. The Red Jonathan was planted by normal cultural practices.

The Yellow Jonathan produced its first fruit last year—about one-half a bushel. The Red Jonathan will not bear even this year. This spring the Yellow Jonathan was approximately 14-feet tall and had a drip-area of the same diameter. The Red Jonathan was barely half as tall and had a drip-area of only six feet. Visual differences in the two plantings are easily noted in the illustrations.

Mr. Allen also used the system on two trial plum seedlings. The setting that was placed over the stone bore more plums last year than its testmate and is more than three feet taller than the unfortunate planting. The less variation in the sizes of the two plum trees as compared to the variation in the growth of the apple trees is explained by the fact that plum trees have more inherent ability to find and obtain needed moisture.

Unlike the plum, the apple tree is known for its shallow root system. Therefore, the addition of the rock beneath the apple planting will not retard development of the system. Rather, it gives added strength through added moisture availability.

Cultural requirements and care of trees planted with the rock method are no different than those for trees planted in the orthodox fashion. However, the scope of the system naturally

A tree of the same age planted without a rock in the hole.

limits its use to trees having a shallow root system.

The orchard should be planted on gently sloping lands in order to provide good drainage, and the trees should be established on deep sandy loam soils, ranging from sandy clay loams to coarse sands or gravel mixtures. In Oklahoma, trees may be set in the fall, winter or spring. However, fall settings bring earlier root development, the soil has time to settle, and growth begins earlier in the spring. Pruning activities also are the same.

Mr. Allen's experience indicates that cultivation of the orchard or of the area near two or three settings should not be more than three or four inches deep. "It is a mistake to think that deep cultivation forces tree roots downward," he says. "Trees will grow roots in all of the soil that is open and porous enough for root growth, regardless of cultivation—more reason for the rock beneath the setting."

Organic matter for orchard soils also should be maintained at a high level. It improves the water-holding capacity of the soil, prevents wind and water erosion and also supplies some plant food elements. Rotted barnyard manure or compost is suggested as the best supplier of plant food, and may be applied at a rate of 300 pounds per tree.

A Bill Submitted to Congress to Investigate Commercial Fertilizer

This bill, submitted by Congressman Frank Keefe of Wisconsin, is resting snugly in the Rules Committee of the House of Representatives and unless something is done it may die there. If you are interested will you write or wire your congressman asking him to make an effort to have this bill reported out of committee? Here is the Bill:

H. RES. 207
IN THE HOUSE OF REPRESENTATIVES
May 9, 1949

Mr. Keefe submitted the following resolution; which was referred to the Committee on Rules.

RESOLUTION

Whereas this Nation from the time of its founding has depended for its chief food supply on the natural products of agriculture, such as grain, livestock, milk, and poultry; and the food industry utilizes vast quantities of these agricultural products to produce foods to meet the daily nutritional requirements of our people; and

Whereas an increasing proportion of the Nation's food supply is being industrially processed and the industrial techniques of processing food have a direct bearing on the quality of the national diet and the standards of public health; and

Whereas chemicals, compounds, and synthetics on an increasing scale are being introduced and used in the production, processing, preparation, and packaging of food products, and

Whereas under existing law there is no requirement that the chemicals, compounds, and synthetics be demonstrated to be nontoxic before being so used in the production, processing, preparation and packaging of food products; and

Whereas chemicals, compounds, and synthetics are being used to reduce or displace in foods important nutritive ingredients; and

Whereas the trend represented by the use of these chemicals, compounds, and synthetics presents a serious problem not only to the health and welfare of our people but also to the future stability and well-being of our entire agricultural economy; and

Whereas many pesticides and insecticides of known toxicity are being exposed for use in connection with the growing of fruit, vegetables, and forage crops and for the eradication of insect pests, the uncontrolled use of which threatens contamination of the food supplies of the Nation with resulting ill effects upon the health of the people; and

Whereas the use of commercial fertilizer containing excessive quantities of inorganic chemicals is definitely involved in the matter of plant, animal, and human nutrition and health:

Now, therefore be it

Resolved, That there be, and hereby is, created a select committee to be composed of seven Members of the House of Representatives to be appointed by the Speaker, one of whom he shall designate as chairman. Any vacancy occurring in the membership of the committee shall be filled in the same manner in which the original appointment was made.

The committee is authorized and directed to conduct a full and complete investigation and study of—

(1) the nature, extent, and effect of the use of chemicals, compounds, and synthetics in the production, processing, preparation, and packaging of food products to determine the effect of the use of such chemicals, compounds, and synthetics (a) upon the health and welfare of the Nation and (b) upon the stability and well-being of our agricultural economy;

(2) the nature, extent, and effect of the use of pesticides and insecticides with respect to food and food products, particularly the effect of such use of pesticides and insecticides upon the health and welfare of the consumer by reason of toxic residues remaining on such food and food products as a result of such use; and

(3) the nature, effect, and extent of the use of chemicals, compounds, and synthetics in the manufacture of fertilizer, particularly the effect of such use of chemicals, compounds and synthetics upon (a) the condition of the soil as a result of the use of such fertilizer, (b) the quantity and quality of the vegetation growing from such soil, (c) the health of animals consuming such vegetation, and (d) the quantity and quality of food produced from such soil, and (e) the public health and welfare generally. The committee shall report to the House (or to the Clerk of the House if the House is not in session) as soon as practicable during the present Congress the results of its investigation and study, together with such recommendations for legislation as it may deem advisable.

For the purpose of carrying out this resolution the committee, or any subcommittee thereof authorized by the committee to hold hearings, is authorized to sit and act during the present Congress at such times and places within the United States, whether the House is in session, has recessed, or has adjourned, to hold such hearings, and to require, by subpena or otherwise, the attendance and testimony of such witnesses and the production of such books, records, correspondence, memoranda, papers, and documents, as it deems necessary, to employ upon a temporary basis such technical, clerical, and other assistants as it deems advisable and with the consent of the head of the department or agency concerned, to utilize the services, information, facilities, and personnel of all agencies in the executive branch of the Government. Subpenas may be issued under the signature of the chairman of the committee or any member of the committee designated by him, and may be served by any person designated by such chairman or member.

Naturalized *Alyssum Saxatile*

Basket of Gold

By
G. L. WITTROCK

Assistant curator of Education, New York Botanical Garden

IN the spring when plants are bursting out into their colors of welcome, we find in the Rock Garden plantings one group of plants referred to as the "Madworts" or Alyssums, some of the species being white and others appearing in shades of yellow. One of the yellow colonies may be that of *Alyssum saxatile* or "Basket of Gold," also known as "Golden-tuft," "Gold-dust," "Rock Madwort," "Yellow Madwort," *"Felsen Steinkraut,"* and *"Alysse corbeille d'or."* The genus name *Alyssum* is said to be the old classical name. Some authorities claim that the plant was thought in ancient times to possess properties of allaying anger, hence the common name "Madwort," as derived from the Greek meaning of *Alyssum.* No medicinal properties are recorded in modern literature for the species, although it does belong to the Mustard family and one might suspect a possible mustard-like spice or flavor from the foliage or seeds. The species name *saxatile* means "rock." That is why the plant is also called "Rock Madwort," since it loves to grow among rocks.

Of the 120 species of *Alyssum* known, the "Basket of Gold" is without question the most attractive. It is easily grown and should be in all Rock Gardens. Perhaps it is in more common use in the Old World Gardens where the species was introduced as a garden plant in 1710. It is native of the northern Balkans to Crete, southern Russia, the Caucasus and Asia Minor.

The matted perennial plant is woody at the base, 6 to 12 inches tall and has oblanceolate to ovate lanceolate leaves, 2 to 4 inches long; the margins are toothless or wavy, and the surface of the blade is softly woolly or tomentose, sometimes having almost a grayish appearance. The tiny, golden yellow flowers are produced in numerous, short, compact, raceme-like clusters or

Alyssum Saxatile in the Rock Garden

in loose panicles at the end of every branch.

The blooms appear at the end of April or early in May, and if the season is mild, the plants will continue to flower for 3 weeks. If they are trimmed back after spring blooming, it is not unusual for a second blooming to develop in the fall. The profuse blooms and the prostrate or low habit of growth make them a favorite in any Rock Garden planting. They are also used for pavement plantings and in dry walls. A single plant will often spread a considerable distance. Planted in the wild garden section in large masses, they become most effective. The plant grows in shade, but under such conditions it develops rather indifferently. It prefers a sunny exposure, the drier the better, and if properly placed will not have to be reset for years.

There are many varieties and forms such as *var. compactum* or "Dwarf Basket of Gold"; *var. florepleno* or "Double-flowered Basket of Gold"; *var. variegatum* in which the foliage is parti-colored, thus making the plant most attractive after the flowering period has passed; *var. lutem,* a lemon colored variety; and finally "Silver Queen," the palest of yellow flowering forms.

The plants are usually propagated by root division; cuttings are also possible, and the seeds germinate readily. If the plants become "leggy" or the stem too elongated as it covers the ground, it is best to raise new plants, either by division or seeds. The plant may rot away at times during severe winters. If the mat survives well, wait until new shoots appear near the base, then cut the leggy shoots back. Divisions are so easily prepared that extra plants should always be on hand for replacement. The colony sometimes dies out because of too wet ground. Well drained soil is essential, and if possible, the foliage should be kept dry.

The plantings in our Rock Garden were most attractive this spring, and in contrast with the perennial Candytuft and Aubretias with their shades of purple to magenta, the "Basket of Gold" stood out in a blaze of yellow. It is one of the standard Rock Garden plants you should put on your list, if you do not already have it in your Rock Garden.

Garden Calendar—August

THE NORTH AND EAST

August is one of the most important garden months in the year. It marks the transition from summer to autumn, and is the time for harvesting the spring-planted crops and for planting seeds of vegetables for the autumn table and winter storage. It is time also for sowing seeds of hardy annual and biennial flowers for early growth and blooms next spring.

Collect and save seeds from all flowers and vegetables which ripen in August and the following months. These should be cured in a protected, airy place, threshed, and placed in properly labeled containers.

The Flower Garden. Transplant perennials which have completed their growth for the year and are through the blooming period: irises, lilies (madonna, candidum, umbellatum, Turk's), daffodils, *colchicums*, oriental poppies, fritillaria, Virginia bluebells, primroses, and *doronicums*. It is well to put a handful of equal parts of compost and sand under each bulb in the case of bulbiferous plants.

As soon as perennials are through blooming and the desired seeds have been collected, place the tops in the compost heap to prevent self seeding. Cut back straggly petunias so that they make new growth and bloom again before winter. Also cut back sweet alyssum, nigella, and California poppies to prolong the flowering period. Keep other annuals and perennials blooming by cutting them freely for indoor decorations.

Make cuttings of the current year's growth just as soon as the stems begin to harden, including carnations, wall flower, geraniums, fuchias, and other plants that you want for your winter window garden. Daphne cuttings may be rooted in a mixture of sand and peat, as they are acid-loving plants. English ivy cuttings made in August will make good plants before winter.

Chrysanthemums which have been kept under black cloth to reduce the number of daylight hours may be exposed to the natural day after August 15. Stake cosmos and other tall plants in danger of lodging. Thin out the rock garden plants. Cut and cure strawflowers and other everlastings for winter bouquets. Strip the leaves from the stem, tie in loose bunches, and hang them heads down in a cool airy place to dry.

Shrubs and Trees. Some August-blooming shrubs are buddleia, abelia, Spanish broom, lavender, the heathers, and crepe myrtle. Roses should be watered if necessary and given a good top dressing of compost. Hedges of privet and barberry should be pruned again in August. They can be kept most beautiful by frequent pruning.

The Lawn. Prepare the soil in August. For established lawns, watch crabgrass to prevent it from going to seed. Since it can pass the winter only in the seed stage, it can be controlled most easily by preventing seed formation.

THE WEST

August is not too early to begin to think of seeds, seed pods, and all kinds of fruits that can be fashioned into beautiful Christmas decorations. Some that may be used for this purpose are eucalyptus pods in a great variety of shapes and sizes, catalpa pods, peony capsules, the spiny heads of teasel which may be brilliantly stained, the thin spoon-shaped pods of jacaranda, and the ornamental gourds. Also watch for seedlings that may be transplanted and grown for Christmas plants. They should be ready for potting in October.

The Flower Garden. Plant bulbs of calla, freezia, madonna lily, ornithogalum, oxalis, bulbous irises, and colchicum. Make cuttings of coleus, geranium, lavender, and heliotrope for your winter garden. Highly recommended for winter color are calendula, nemesia, Drummond's phlox. Transplant bleeding heart and oriental poppy. Make plant selections for next year of gerbera and delphinium while they are in bloom. Keep chrysanthemums pinched back to get bushy plants and plenty of flower heads. Feed them until the buds are fully formed but not after then. Moisture is one of the big problems in west coast gardens. Keep the soil mulched.

Sow seeds of perennials. Pot for spring forcing bulbs of narcissus, hyacinth, tulip, freesia, daffodil, and calla lily.

Shrubs and Trees. Roses should be watered and well mulched with compost. Old canes of polyanthus and climbing roses should be cut out at this time. Shrubs may be transplanted. Make cuttings of woody plants.

Lawn. Do not cut the grass too closely during hot dry weather. Fertilize and mulch the grass with finely screened compost. Prepare the soil for new lawns and fill up uneven places in the lawn.

THE SOUTH

August is a hot month in the South but there always are garden chores to be done.

The Flower Garden. Bearded iris and matured bulbs may be taken up and dried off in a shaded airy place. The irises can be replanted at any time. This is the time also to plant all kinds of narcissus, madonna lilies, and such fall-blooming bulbous plants as lycoris, sternbergia, and hydranthus. August is the best time to transplant camellias. Transplant pansies and violas now for autumn blooms. Sweet peas for Christmas should be planted this month. Dahlias may be given a feeding, and for large heads, pinch off the secondary buds.

THE LOWER SOUTH *

The Flower Garden. This month is practically vacation time for the flower gardener, as far as planting is concerned. A few plantings can be made, such as gaillardia, globe amaranth, ornamental sunflower, portulaca, verbena, vinca or periwinkle, zinnia. The gardener can now enjoy the results of former plantings that continue through the summer.

Vegetable Garden. This month begins the season for planting celery seed, which should be sown on the surface, pressed down with a board, and protected from the sun. Some growers of home gardens cover the rows with burlap sacking and allow the seeds to sprout while thus protected. Tents of muslin are best for large plantings. Collard, eggplant, mustard, okra, pepper, rutabaga, New Zealand spinach, and turnip are suitable for plantings at this time. Velvet beans for a cover crop, chicken corn and chufas for poultry can be raised to advantage this month.

Trees and Shrubs. An excellent tree to plant in Florida is the papaya. It is remarkably quick growing. A young tree six inches in height planted in the

* Edwin H. Abrams, St. Cloud, Florida

spring will mature its fruit in the fall. For the benefit of those who are not familiar with this "melon that grows on a tree" it can be said that this fine fruit is one of the most wholesome and well flavored of all the Florida fruit. The flesh resembles in color and consistency that of a cantaloupe. The black seeds are edible. The doctors say eat some of the seeds. This tree will grow on either muck land or sand, but prefers the muck. If planted in sandy soil it needs very liberal fertilizing. It responds quickly to compost, and will stand almost any amount. As the feeding roots are near the surface there should be as little cultivation as possible. Six inches of mulch over the compost will prevent most of the weeds and grass from starting.

SOUTHWEST **

The Flower Garden. In August our rainless hot weather period is at its height. Sowing seeds either in the seed beds or in the open is not recommended. Planting should be limited to a few heat-resistant annuals such as asters, ageratum, cosmos, marigolds, petunias, verbenas and zinnias. Amateurs can depend on these which are already established in plant bands, that can be had from local nurseries. Single wilt-resistant and anemone asters may be planted for quick effects. For color during late September, October and November, there are many types of French and African marigolds and almost any number of zinnias and petunias (the California Giant Ruffled). Ground should be prepared for Christmas sweet peas. Those planted by the first of the month will blossom by Thanksgiving. Spade over ground for the planting of early October lawns and allow the successive weed crops to come up to save laborious weeding later. Prepare beds for primulas, cinerarias, snapdragons, stocks, pansies and violas for winter bloom. Such bulbs as *Sternbergia lutea* and the different *Colchicums* should be put in.

Early blooming bulbs such as freesias, watsonias, sparaxis, and other South Africans can be planted. *Lilium candidum* and the Tazetta narcissus (paper white), *Soleil d'Or* and Chinese Lilies should be put in as soon as obtainable for holiday bloom. Stake, feed and water dahlias and chrysanthemums.

Shrubs and Trees. Monthly watering of all deciduous and citrus fruit trees should not be neglected. Make a large basin extending from one foot from the trunk to the dripline. The use of soil-soakers gets the water where it belongs without waste. Mulch after each watering. Encourage your deciduous shrubs to continue making their strong new growth. Lilacs are an exception. Water your shade gardens, azaleas, rhododendrons, camellias and their companion plants. Mulch with compost, leaf mold and Georgia peat. None should dry out in this critical bud-forming period. Use overhead sprinkling to cool the air and increase humidity during excessively warm spells. Make the rounds of nurseries to select seasonable material for new plantings.

Vegetable Garden. Keep your compost bin working full time, using every bit of available waste material which will decay rapidly. Avoid chemical activators. Humus which burns out rapidly needs to be constantly replenished. Top mulch all your rows. Cut back old artichokes, give a thick mulch of compost and water heavily to produce new bud growth. Succession crops of beans, corn, and the different summer squashes can be planted. By giving slight shade and using Slobolt, Oak Leaf and Bibb lettuce, you can have tender salad material the entire hot season. Watch the plants coming on in your seed beds for the September planting of winter vegetables. Further sowing of these may be made the first of the month if you have not done so earlier. Prepare ground for the September planting by incorporating compost in available areas and sink the water down twelve to eighteen inches before planting seeds or setting plants, or set sprinkler to simulate a rain.

** Charlotte M. Hoak, 1125 Stratford Ave., So. Pasadena, California

Baking whole-wheat bread

Two-by-Four Farm

By

ALDEN STAHR

AN organic farm in miniature is to be found at the home of Daryl Chapin in Basking Ridge, New Jersey, for here are not only the vegetables and flowers of the home garden but fruits and grains usually associated with full-sized farms. An avid organic gardener, Mr. Chapin began raising food the natural way in quest of better health for his family and himself, the basic reason for all organic gardening. But he found that the percentage of organic foods which they were raising was not high enough to be significant. For a while he bought grain from a farm which was "mostly organic" and purchased a small hand mill to grind it. The hand grinding process was slow, so Mr. Chapin rigged the mill to the power lawn mower and now grinds the grain as he needs it, about once a week. He reports that the mill, which cost eighteen dollars, paid for itself in the first hundred pounds of flour it ground, for he had been paying as much as thirty dollars per hundredweight of whole-wheat flour organically raised, and by buying the grain and grinding it the cost was reduced more than half.

Now, to be sure that his grain is grown completely organically, Mr. Chapin is raising a patch of rye and a patch of wheat in his own garden and this, of course, will reduce the cost of his flour to almost nothing except for labor. And as to that, we agreed that when you garden organically you're working for health and not for dollars, and the reward is something that dollars cannot buy.

Mr. Chapin goes all the way with his whole-grain program. He harvests the grain with a scythe and threshes by beating in a barrel. After grinding his own flour he bakes the whole-grain bread for his family, six loaves at a time to last the week. He had just finished a batch when we arrived and the aroma was enough to make a man feel starved. We were treated to a sample and the bread was as delicate in flavor and as satisfying as the aroma had promised. He does not knead his bread, but simply mixes the ingredients —so much of this and a pinch of that and the result is a gourmet's delight. At first, he had had the heat too low in the oven and credits his wife with straightening him out on this point.

While we stood in the kitchen munching the bread, the Chapin's dog sat up and begged for some and then went through a repertoire of fancy tricks, each time for a morsel of bread. It turned out that Heather will do these tricks only for organic whole-wheat bread —for white bread she won't even roll over and play dead!

Even meat and poultry are raised miniature farm style at the Chapins. The chickens are banties and the meat comes from rabbits, huge Belgians as tender as the white meat of chicken.

Milk is a problem at present, for pasteurized store milk is far from the high food value of organically produced milk from your own animals, but the Chapins plan to remedy this by having a milch goat which they can feed with their own grass and grain.

Although the Chapins have a compost heap for processing vegetable and animal waste, this would not produce enough compost for their requirements, so they rely largely on leaves brought in from the outside in the fall. Last year the whole family co-operated in bringing in five hundred gunny sacks of leaves rescued from wasteful fall fires and these are used to mulch garden, berry bushes and trees.

Darvl Chapin is a scientist and so is very skeptical about health claims or claims of any kind. He says that organiculture has to prove itself in health returns before he'll go along all the way with it. In the past years he has been extremely susceptible to colds and their accompanying miseries with resultant loss of time from work —last winter he lost only one day and the whole family has seemed healthier in general, even though they are not yet on a 50% organic basis. The Chapins believe that these early results make it worth while to make even further efforts toward producing most of their food organically.

Child and organically grown wheat

Chapin grinding whole-grain flour

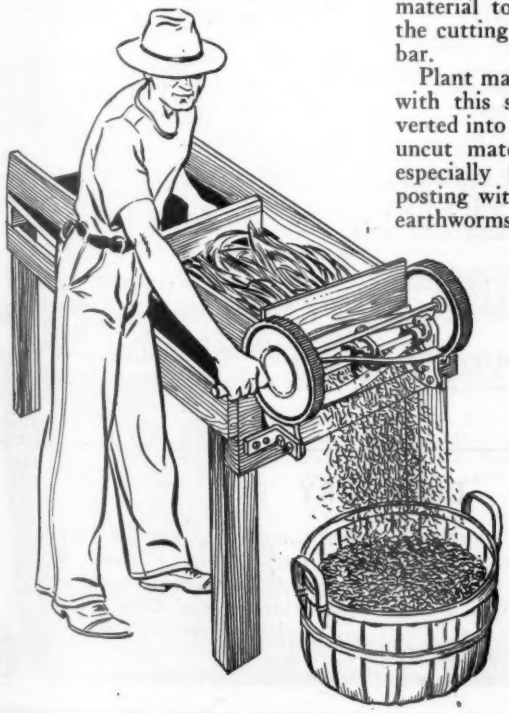
HOMEMADE PLANT CUTTER

A SIMPLE, inexpensive but efficient plant materials cutter can be made from a lawnmower. Either remove the handle and braces of your regular lawnmower, or purchase an old one at a sale for a small amount of money. Mount the lawnmower in such position that the cutting bar is in a vertical position and flush with the bottom of the feeding trough of the wooden table that can be constructed of waste lumber. This should be a table of convenient height and well braced with stout boards. The feeding trough should have sides three or four inches high and a bottom which will permit easy feeding of the plant material into the machine. For easy feeding of the plant material into the machine, line the feeding trough with bakelite or galvanized metal.

The machine may be operated by hand, as shown in the drawing, or with a motor mounted on a platform attached to a leg or frame of the machine. For hand operation, drill a small hole half way between the center and edge of one wheel and attach a handle with a bolt and nut. To operate with a motor it is necessary to attach a pulley to the wheel. The pulley on the motor should be relatively small while that on the lawnmower wheel should be much larger so that the machine is not turned too rapidly and does not choke up easily.

For feeding the plant material into the machine, use a rectangular piece of board with a handle attached to one side so that it can be used as a "pusher." While the machine is operated with the right hand, the material is fed into the machine with the left hand just fast enough to allow the material to be cut without jamming the cutting knives against the cutting bar.

Plant materials cut into small pieces with this simple device can be converted into compost more quickly than uncut materials. Such materials are especially favorable for quick composting with biological activators and earthworms.



Designed, assembled and tested in the Organic Gardening Experimental Farm Workshop at Emmaus, Pa.

ORGANIC GARDEN CLUBS

The following Organic Garden Clubs have been organized and are having regular meetings. With them we want to cooperate in every way possible, as to provide films on different aspects of gardening and farming, and health; help with programs and speakers, and furnish literature.

Name of Club	Officers
Organic Garden Club of San Francisco, S. F. City College Garden Building, San Francisco, California.	President Mr. Charles Gibson, 219 Faxon Avenue.
Tulare County Organic Gardening Club, 400 Howard Street, Visalia, California.	Secretary-Treasurer Mr. Jonathan W. Hughes, 400 Howard Street.
Valley Organic Agricultural Club McAllen, Texas.	President Mr. E. M. Card.
Organic Gardening Club of San Antonio, San Antonio, Texas.	President Mr. Joe A. Noake, 1842 W. Mistletoe Street.
Organic Garden Club of Western Michigan, Route No. 3, Box 171, Muskegon, Michigan.	Secretary-Treasurer Mrs. L. H. Eyestone, Route No. 3, Box 171.
The Organic Gardening Club of Eastbay, 215 Highland Avenue, Piedmont 11, California.	Secretary Mrs. K. F. Dittman, 215 Highland Avenue, Piedmont 11, Calif.
Organic Gardening Club of San Diego, Room 201, Roosevelt Jr. High School, Upas & Park Blvd., San Diego, California.	President Mr. Robert Calvin.
Organic Gardening Club of Big Flats, Big Flats, New York.	President Mr. Erwin Rounds.

Organic Gardening encourages the organization of other Clubs. If organized clubs do not appear in the above list, please register with us immediately.

DIRECTORY

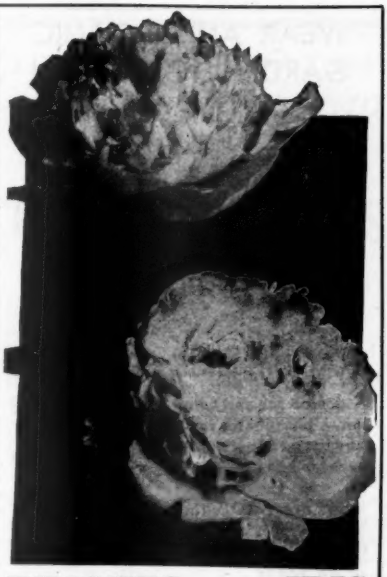
Organic Gardening invites all who have organically grown foods for sale to list them in the Organic Gardening Directory. There will be no charge for listing your name, address, and organically grown produce in this directory.

Write us, telling in detail what you have that is organically grown, detailing how long and in what manner you have applied the method. Write to

Organic Gardening, Emmaus, Pa.

The Soil and Health Foundation

The Soil and Health Foundation has just completed an exhaustive feeding experiment on white mice carried out in the Biochemical Research Laboratory of Dr. Ehrenfried E. Pfeiffer. In these experiments healthy and cancerous strains were included. Some mice were fed water and organically grown wheat. Others were fed wheat grown in soils which have been fertilized with artificial chemical fertilizers. As a check, still other mice were fed the regular pellets which are supposed to contain a full and balanced diet. The results of these experiments are extremely favorable to the organically grown foods as expressed in general health, resistance to disease, psychology, and fertility of the mice. A complete report of this study will be published in the next Soil and Health Foundation News which will soon be sent to all members. Send contributions to the Secretary, Soil and Health Foundation, 46 S. West St., Allentown, Pennsylvania.



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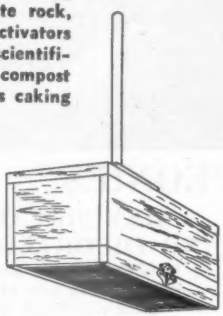

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GARDEN LILIES by Alan and Esther MacNeil. (Oxford University Press, 114 Fifth Avenue, New York 11, New York. 1946 $4.00)

Garden Lilies is a handbook for the successful growing of lilies which must be regarded as the aristocrats of the garden. This book gives the gardener the help he needs in planning the garden, selecting and ordering bulbs, planting the bulbs, and caring for the plants. Like roses, lilies are world-wide in distribution, and in growing them one needs to know something of the homeland of each species. Only with this information can one grow particular lilies at their best. Every aspect of successful lily growing is treated with sufficient detail to insure success. (Editor's Note: Pests and diseases can be controlled by providing exactly the right kind of soil and climatic conditions and maintaining a good biological balance among animals in the environment). Cloth bound, 226 pages, well illustrated, Selected bibliography. Good index.

MAINTENANCE OF SHADE AND ORNAMENTAL TREES by P. P. Pirone, with a Foreword by L. H. Bailey. Second Edition. (Oxford University Press, New York, New York. 1948 $6.50)

This book deals with clarity and thoroughness with every aspect of the general maintenance practices of trees which are grown to ornate our home grounds, streets, and parks. It has become a staple volume in the working library of every arborist, city forester, and park superintendent; and has proved an invaluable handbook for the homeowner who needs detailed information on the nature and habits of trees and their relation to the soil. If trees are grown under environmental conditions exactly like those which prevail in their natural habitat, there will be little need for artificial control of insects and diseases. Every cultural practice should be checked before a tree is exposed to the indignity of arsenical, mecurial, or copper poisons or the even more toxic poisons usually labeled as the newer insecticides. Cloth bound, 436 pages, Selected bibliography, well illustrated, well indexed.

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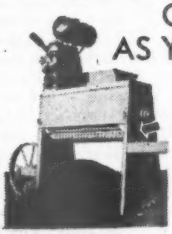

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CUCUMBERS AND COMPOST

Q. Our clay soil has improved so very much since we have been using compost. My cucumbers seem to grow well in the beginning, but at blossom time they tend to turn yellow and drop the blossoms without producing fruit. Can you help me correct this situation?

Mrs. A. J. S., Louisville, Kentucky.

A. Cucumbers, like all members of the cucurbit family, must have a soil very rich in humus. In planting cucumbers you should dig out the soil to a depth of a foot or more and fill the hole with a well-made compost. Then cover the compost with a mixture of equal parts of soil and compost and plant a "hill" of cucumbers in this soil. This method of planting will insure you an abundant setting of cucumbers on vigorous vines.

—o—

WORTHLESS WALNUTS

Q. I would like to know what to do to a large walnut tree that produces bushels of nuts but most of them fall

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It is requested that all orchardists who are operating their orchards organically register with Organic Gardening Magazine. We are interested in getting as many details as possible, as length of time the organic method has been used, size of orchard, kinds of fruits grown, health of trees, and quality of the fruits. Our Staff Photographer may be sent to your orchard to get photographs for feature stories or for other purposes.

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—o—

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Mrs. C. B. S., Spencer, Mass.

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—o—

ANTS IN THE DRIVEWAY

Q. What can I do to eliminate ants from my graveled driveway?

Mrs. F. H., Lewisville, N. C.

A. Ants can be induced to quit working in your gravel driveway by spraying it with crude oil. This will eliminate the ants and settle the dust in the driveway.

—o—

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